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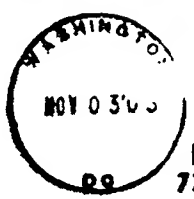
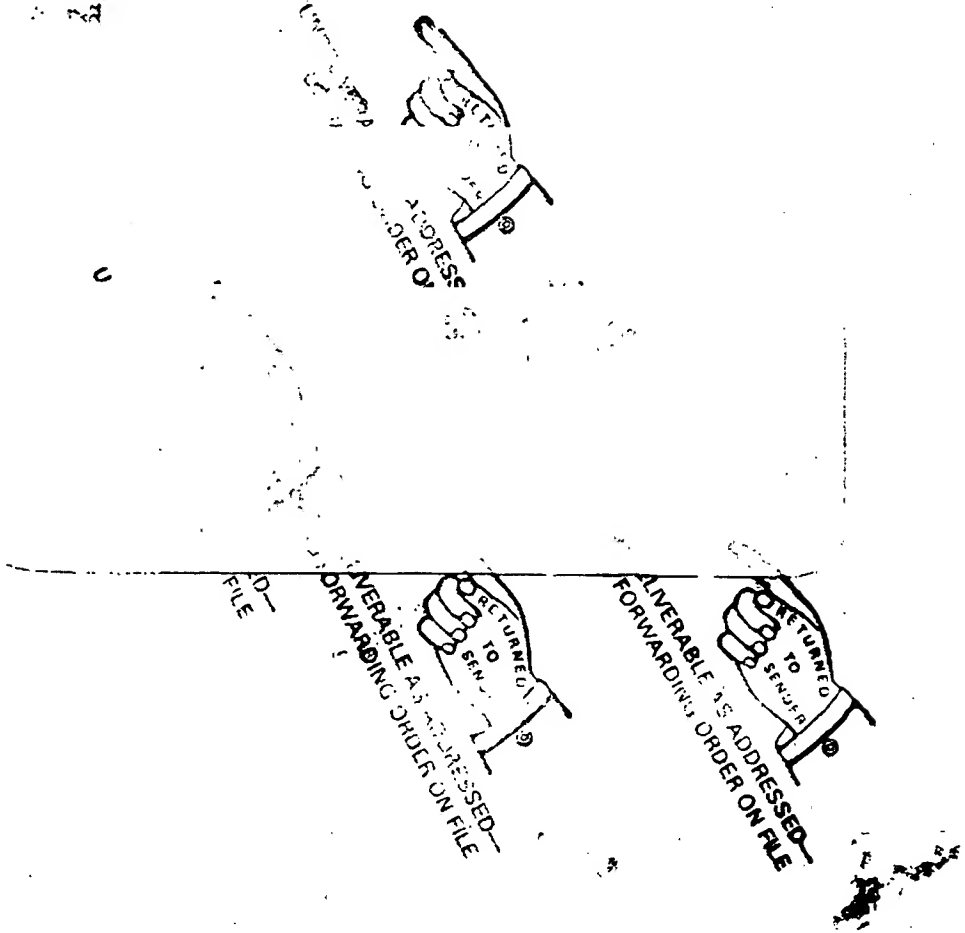
LIVERABLE RETURN IN TEN DAYS



AL BUSINESS

AN EQUAL OPPORTUNITY EMPLOYER



Office Action Summary

Application No.	Applicant(s)
09/756,446	Thomas D. Williams
Examiner	**Art Unit**
Melur. Ramakrishnaiah	2643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Jan 8, 2001* .

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-32* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

KS

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/756,446	01/08/2001	Thomas D. Williams	P992	5545

7590 11/03/2003

Daniel L. Dawes
650 Town Center Dr. Suite 650
Costa Mesa, CA 92626

EXAMINER	
RAMAKRISHNAIAH, MELUR	
ART UNIT	**PAPER NUMBER**
2643	4

DATE MAILED: 11/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-6, 9, 11-16, 17-22, 25, 27-32, are rejected under 35 U.S.C 102(b) as being anticipated by Gershen (UA PAT: 5,801,694).

Regarding claims 1 and 17, Gershen discloses an apparatus and method for delivering user selected files over a distributed network comprising: a server (150, col. 4 lines 52-54) coupled to the distributed network, a client (constituted by 160,165,170,180, 190, fig. 1), a database (110, fig. 1, col. 4 lines 16-36) for storing the plurality of data files communicating with the server (col. 2 lines 60-67, col. 3 lines 1-21), a mixer communicating with the database and server for mixing selected ones of the plurality of data files together, a recorder communicating with the client for recording a user created data track, the client transferring the user created data file to the server and hence to the database (fig. 4, col. 4 lines 40-67, col. 5 lines 1-20).

Regarding claims 2-6, 9, 11-16, 18-22, 25, 27-32, Gershen further teaches the following: server transfers a user selected mixed data file to the client comprised of at least two data files selected by a user from the database (fig. 6 col. 4 lines 40-55), client replays the mixed data file (col. 5 lines 4-5), client stored mixed data file (this step is implicit in much user system out puts

mixed data, col. 5 lines 21-39), processing by the server, client, mixer and recorder process comprise: audio data files, music data files, text data files (col. 6 lines 26-38), database includes data fields for categories and subcategories of data files, data files comprises categories and subcategories of music styles (col. 5 lines 56-67, col. 6 lines 1-25), data files stored in the database are characterized as primary track data file or an accompaniment track data file, mixer mixes into a single data file with at least one accompaniment track data file, mixer mixes plurality accompaniment track data files with primary track data files, primary track data file or the accompaniment track data file is user created (col. 3 lines 63-67, col. 4 lines 1-36), creating a text file associated with a user created data file on a client, transferring the associated text file from the client to a server on the distributed network and to a database communicated with the server, the database having stored therein a plurality of data files each with text files associated therewith, and transferring the mixed plurality of data files from the server to the client via the distributed network with associated text files corresponding to each data file which has been mixed to-gather (col. 6 lines 26-56).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 7 and 23, 8 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gershen in view of Robell et al. (WO98/48532, hereinafter Robell).

Gershen differs from claims 7 and 23 in that he does not teach the following: data files processed comprise wav files.

However, Robell discloses customized music distribution and playback system which teaches the following: data files processed comprise wav files (page 5 lines 34-35, page 6 lines 1-12).

Thus, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Gershen's system to provide for the following: data files processed comprise wav files as this arrangement would provide one of the well known formats for storing and processing the files as taught by Robell.

Regarding claims 8 and 24, Gershen does not teach the following: server and client compresses data files communicated with the network and uncompresses files received from the network.

However, Robell discloses customized music distribution and playback system which teaches the following: server and client compresses data files communicated with the network and uncompresses files received from the network (page 5 lines 15-33, page 6 lines 31-35, page 7 lines 1-16).

Thus, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Gershen's system to provide for the following: server and client compresses

data files communicated with the network and uncompresses files received from the network as this arrangement would facilitate reducing the data for storage and transmission as taught by Robell, thus minimizing the transmission bandwidth and storage space as is well known in the art.

5. Claims 10 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gershen in view of Abecassis (US PAT: 6,192,340 B1, filed 10-19-1999).

Gershen differs from claim 10 and 26 in that he does not explicitly teach the following: files processed comprises associated picture data files.

However, Abecassis discloses integration of music from a personal library with real time information which teaches the following: files processed comprises associated picture data files (col. 1 lines 42-51, col. 29 lines 20-25).

Thus, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Gershen's system to provide for the following: files processed comprises associated picture data files as this arrangement would provide means to enrich audio with accompanying video as taught by Abecassis.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melur Ramakrishnaiah whose telephone number is (703) 305-1461. The examiner can normally be reached on Monday to Friday from 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz, can be reached on (703) 305-4708. The fax phone number for this Group is (703) 305-9508.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3900.

7. **Any response to this action should be mailed to:**

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or faxed to:

(703) 308-6306, (for formal communications intended for entry)

Or:

(703) 305-9508 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Melur. Ramakrishnaiah

PRIMARY EXAMINER

Art Unit 2643.

Notice of References Cited	Application/Control No. 09/756,446	Applicant(s)/Patent Under Reexam Thomas D. Williams	
	Examiner Melur. Ramakrishnaiah	Art Unit 2643	Page 1 of 1

U.S. PATENT DOCUMENTS

		Document Number Country Code-Number-Kind Code	Date MM-YYYY[1]	Name	Classification[2]	
	A	5,801,694	9/1998	Gershan	84	602
	B	6,192,340 B1	2/2001	Abecassis	704	270
	C					
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FOREIGN PATENT DOCUMENTS

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	N						
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	Q						
	R						
	S						
	T						

NON-PATENT DOCUMENTS

		Include, as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages
	U	Robell et al. ; Custimized music distribution and playback system; 10-29-1998, WO 98/48532.
	V	
	W	
	X	

* A copy of this reference is not being furnished with this Office action. See MPEP § 707.05(a). [1] Dates in MM-YYYY format are publication dates. [2] Classifications may be U.S. or foreign.

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(43) International Publication Date: 29 October 1998 (29.10.98)

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(30) Priority Data:
08/840,536 22 April 1997 (22.04.97) US

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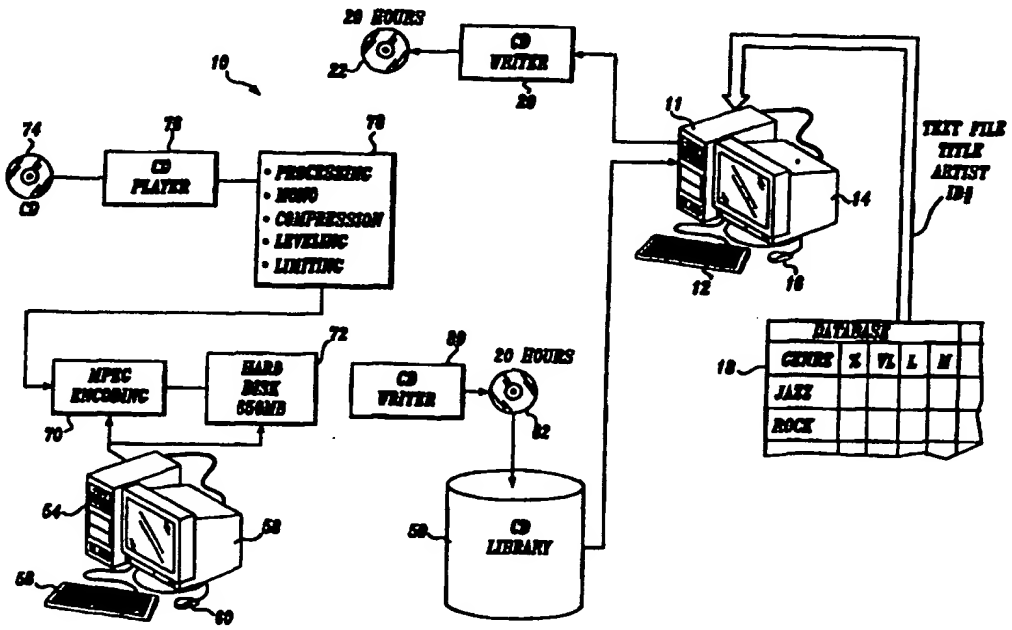
(74) Agent: TULLETT, Rodney, C.; Christensen O'Connor Johnson & Kindness PLLC, Suite 2800, 1420 Fifth Avenue, Seattle, WA 98101 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
Without international search report and to be republished upon receipt of that report.

(54) Title: CUSTOMIZED MUSIC DISTRIBUTION AND PLAYBACK SYSTEM



(57) Abstract

A system for creating customized CD–ROMs of compressed audio data. A computer system includes a database of music that is categroized by a plurality of factors. A user selects which factor they require and the computer system selects songs meeting the criteria selected. The selected songs are compressed and stored as files on a CD–ROM. A CD–ROM player including a computer and an MPEG decoder plays the compressed audio files. The CD–ROM has instructions encoded thereon that define the order of the songs to be played and the length of time for which a group of songs will be played.

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CUSTOMIZED MUSIC DISTRIBUTION AND PLAYBACK SYSTEM

Field of the Invention

The present invention relates to audio systems in general and, in particular, to background music audio systems.

Background of the Invention

In virtually every retail and consumer establishment, it is common to find background music systems. To provide the musical content for such systems, it has generally been necessary to purchase a special receiver that receives satellite broadcasts of the background music. Alternatively, it had been necessary to subscribe to a service that provides customized recordings of background music. Both solutions have inherent problems.

When a user subscribes to a broadcast music distribution service, they are forced to play the music that is selected by the broadcaster. Although a user may sign up to receive broadcasts of a specific genre of music, such as all classical or jazz, etc., the user has little say in the particular musical selections that will be played. In many retail or office environments, the particular music to be played is carefully selected based on a variety of factors such as style, beat, ethnic origin, etc. With the broadcast music service, the user cannot guarantee that music meeting their requirements will always be played.

For users who sign up to receive customized recordings of various music styles, the selection of the background music can be more specifically tailored to a particular environment. Such customized recordings are typically made in real time. That is, it takes a technician four hours to record four hours worth of music. Therefore, such customized recordings are prohibitively expensive for most users.

These customized recordings are generally delivered to the user on audio tapes or Compact Discs. This limits the amount of music that can be stored on a single recording. Therefore, the user must continually monitor the operation of the background music system and rotate the recordings in order to avoid playing the same musical selections over and over. In addition, if the user wants to control the time at which particular musical selections are played, he or she must manually adjust the operation of the player at the desired time.

Given the shortcomings in the prior art, there is a need for a music playback system that provides the benefits of a customized music recording and long play time without repeats. In addition, there is a need for a music playback system that can automatically control when audio selections are played to eliminate the need for on-site user programming.

Summary of the Invention

The present invention is a music playback system whereby a user can create a customized CD-ROM recording of a variety of musical selections. The user interacts with a computer database that categorizes music by a number of attributes including genre, style, beats per minute, etc. The user selects attributes of music they would like to record and the computer searches the database for music that matches the selected attributes. Music matching the selected attributes is divided into one or more groupings or "programs." Each program can be instructed to play continually or sequentially. The musical selections that comprise each program can be played sequentially or randomly and each program can be assigned a maximum length of play. In addition, commercials or announcements can be inserted into the programs.

To increase the amount of audio data that can be stored on a single CD-ROM, the present invention stores the data in a compressed format. The currently preferred format is MPEG I, Level 2 that was developed by the Motion Pictures Exchange Group for the storage and transmission of audio and video data. A single CD-ROM created according to the present invention can store up to 18 hours of music quality audio data.

In addition to storing the compressed audio data, the CD-ROM also stores a computer program that operates a CD-ROM player as well as a playlist. The playlist provides data about the CD-ROM and defines the number of programs on the CD-ROM. A definition of each program is also stored on the CD-ROM. The program definition includes an identification number of the program, a program title, a

playtype either continuous or sequential, a maximum play time, and a list of audio files that comprise the program.

To play the CD-ROM, a CD-ROM player is provided. The CD-ROM player is designed around a standard IBM-compatible computer including CD-ROM reader and an MPEG decoder. Files of compressed MPEG data are read by the computer, stored in its memory, and sent to the MPEG decoder as specified by the program definitions.

Brief Description of the Drawings

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a block diagram of a system for creating customized CD-ROMs of compressed audio data according to the present invention;

FIGURE 2 illustrates the data that are stored on the CD-ROM;

FIGURE 3 is a block diagram of a compressed audio CD-ROM player according to the present invention; and

FIGURES 4A–4B are a series of flow charts showing the operation of the CD-ROM player according to the present invention.

Detailed Description of the Preferred Embodiment

To compensate for shortcomings in the prior art background music playback systems, the present invention is a system for creating customized CD-ROMs containing up to 18 hours of compressed audio data and a player that can decompress and play such audio data.

As discussed above, in many retail and customer environments, the music to be provided for the customers or clients is carefully selected. Such selections are based on a variety of factors including the music's genre, such as jazz or rock, as well as style within a given genre, such as Dixieland jazz, acid jazz, swing jazz, etc. Musical selections may be further selected within a given style by the gender of the artist, number of musicians, beats per minute, etc. To provide a user with a customized recording of songs matching one or more particular musical styles in which they are interested, the present invention comprises a computerized system for creating recordings of compressed audio data.

As shown in FIGURE 1, the present invention is a system 10 that allows a user to select styles of music in which they are interested and to record songs meeting

the user's criteria onto a CD-ROM. A computer system 11 of the type including a conventional keyboard 12, monitor 14, and pointing device 16 such as a mouse, runs a database or spreadsheet program that allows a user to select a variety of musical attributes. The database or spreadsheet program 18 categorizes a library of prerecorded songs by these attributes including artist name (lead), artist's names (supporting), year (song written), year (song recorded), year (album), artist nationality (lead), instrumentation (supporting), instrumentation (lead), solo (instrument/s), music genre (21 total options), music style(s) (256 total options), beats per minute, energy level (5 total options), record company, performance company (ASCAP, BMI, SESAC, etc.), publisher, instrumental/vocal, artist gender (lead), artist gender (supporting), charts (position reached on charts "Billboard"), weeks on charts. The user interacts with the database program by selecting the attributes they want for their music.

The attributes selected are made on a program-by-program basis, wherein a program is a group of songs that meet the criteria selected. For example, a user may want a program to contain 25% rock music and 75% jazz, wherein the jazz category is further broken down into 50% Dixieland, 25% fusion, 10% swing, and 15% acid jazz. The acid jazz category can be further broken down quite specifically to only include, for example, songs that have a fast beat and high energy, that were recorded by female artists. Finally, the user selects a maximum play time for the program, whether the program is to be continuously played and whether the songs that comprise the program are to be played sequentially or in a random order.

In the presently preferred embodiment of the invention, a user can have up to four programs per recording. The total play time for all the programs cannot exceed the capacity of the CD-ROM, which is currently about 18 hours. For the purposes of the present application, the term "song" is meant to include music both with and without lyrics. In addition to music, the user can also record advertisements or announcements in a program.

After the user has selected what type of music is to be recorded in each program, the computer system 11 generates a list of songs including a unique identification number that identifies a computer file containing a compressed recording of the song, the title, and the artist of a song that match the user's selected criteria. Using the identification number of each song specified in the list, the computer system 11 recalls a compressed recording of the song from a CD-ROM library 50 and records the song on a CD-ROM 22 using a CD-ROM writer 20. Once

the criteria of the music to be played have been selected, it is possible to create a CD-ROM containing 18 hours of recorded music in approximately seven minutes.

In a conventional Compact Disc, the amount of real time audio data that can be stored thereon is limited to approximately 74 minutes. In order to increase the amount of data that can be stored on a single recording, the present invention stores the audio data as a compressed file that is preferably encoded using an MPEG I, Level 2 format. In an MPEG compression system, a string of real time digitized audio data is compressed by converting the string into one or more binary "packets" that represents an input into a mathematical equation. When an MPEG decoder is provided with a packet, it computes the mathematical equation to recreate the original string of digitized audio data. Because the binary "packets" contain less binary digits than the original string of audio data, the amount of audio data that can be stored by recording the packets versus the original uncompressed, audio data is greatly increased.

To compress a song, the system 10 also includes an encoding station that comprises a computer system 54 having a conventional keyboard 56, monitor 58, and pointing device such as a mouse 60. The computer system 54 interfaces with and operates an analog-to-digital converter/MPEG encoder 70 model number SX-23e produced by Antex Corporation of Sunnyvale, California, and a hard disk drive 72. A song to be compressed is retrieved from an uncompressed Compact Disc 74, which is played in a conventional Compact Disc player 76. The output of the Compact Disc player 76 is fed into a number of audio processors 78 including a summing network such as a mixer that converts the analog stereo/audio signal into a monophonic signal. In addition, the monophonic signal is limited, to remove musical spikes that exceed a predetermined threshold and is compressed and leveled to increase the audio power of the soft passages and decrease the audio power of the loud passages. As an alternative to the Compact Disc player 76, audio data, such as commercials or announcements may be recorded on audio tape and played by a tape player.

After processing, the processed audio data is applied to an input of the MPEG encoder 70. The MPEG encoder 70 samples the processed monophonic audio signal at approximately 48,000 samples/second. Each sample consists of 16 bits of data for a total of 768,000 bits of data for a second of audio. The MPEG encoder compresses this data to 80,000 bits per second for a compression ratio of 9.6:1.

The compressed audio data are written as a .WAV file on the hard disk drive 72. The .WAV file format is specified by the Microsoft Corporation for

audio/video files and is considered well-known to those of ordinary skill in the art. In addition, the title of the song, the artist, the copyright licensor and all the musical attributes of a song described above are written to the database 18. When the hard disk is full, it is connected to a CD-ROM writer 80 that transfers the .WAV files onto a CD-ROM 82. The CD-ROM 82 is then placed in the CD-ROM library 50 where it can be accessed by the computer system 11 in order to create a customized, compressed CD-ROM 22 for a particular user. It should be appreciated that not all the data for a song stored in the CD-ROM library are transferred to the CD-ROM 22 that is created for a user. For example, the length of a song and the copyright licensor are not recorded. This information is only used by the computer system 11 to calculate how many songs can be recorded and to make sure the appropriate royalties are paid.

FIGURE 2 illustrates the data that is recorded on the CD-ROM 22. At the beginning of the CD-ROM is a file that contains a computer program 90 that operates a CD-ROM player that plays the CD-ROM. Following the computer program 90 is a playlist 92 that identifies the version number of the program, an identification number of the CD-ROM, a title of the CD-ROM, the number of programs stored on the CD-ROM (presently between one and four), and the number of compressed music/audio files that are stored on the CD-ROM.

Following the playlist is a number of program files 94 that describe each program stored on the CD-ROM. Each program file includes an identification number, a title of the program, a play type (either continuous or sequential), the song play type (either continuous or random), the maximum play time of the program and a list of songs that are included in the program, including the artist and title information, as well as identification number of the compressed audio file that contains the song. Following the program files 94 are a series of compressed audio files 96.

As will be described in further detail below, by recording the playlist and the description of each program, the CD-ROM player can play one or more programs on the CD-ROM in a desired order without human intervention or on-site programming of the CD-ROM player.

FIGURE 3 is a block diagram of a CD-ROM player that plays the compressed audio files described above. The CD-ROM player 110 generally comprises an Intel 386, IBM-compatible computer 112, a CD-ROM reader 116, a number of switches 118, a display 119 and an MPEG decoder/digital-to-analog converter 122. The switches 118 are connected to either the computer's interrupt lines or I/O port so

that a user can enter commands which alter the program operation of the computer 112. The display 119 is provided as a means for allowing the computer to display information for the user.

The CD-ROM player 116 reads the compressed audio CD-ROM to be played and transfers the data to the computer's memory. To decode the compressed audio data, the MPEG decoder 122 comprises an SX-5e MPEG player also available from Antex Corporation. Data is transferred from the computer's memory to the MPEG decoder on a data bus 124. A series of control/interrupt lines 126 allow the computer 112 to control the operation of the MPEG decoder 122 and vice versa.

The operation of the computer 112 to decode the compressed audio data is set forth in the flow charts shown in FIGURES 4A–4B. As indicated above, the computer program that operates the computer 112 is contained on the CD-ROM that is inserted into the CD-ROM reader 116. Upon startup, the computer 112 reads the program from the CD-ROM reader 116 and stores the program in its internal memory. Execution of the program then begins in order to play the compressed audio data.

As shown in FIGURE 4A, the first step performed by the computer unit is to initialize the display 119 and the MPEG decoder 122 at a step 150. At a step 152, it is determined whether an error occurred during the initialization step. If yes, then the program is immediately halted. Assuming that no error occurred during the initialization, the computer reads a play list from the compressed audio CD-ROM. As described above, the play list comprises a series of data including the version number of the program being operated, an ID number of the CD-ROM, a title of the CD-ROM, the number of audio programs stored on the CD-ROM, the number of compressed audio files that are stored on the CD-ROM. At a step 156, it is determined whether an error occurred in reading the play list from the CD-ROM. If so, the program exits at a step 158.

Assuming no error occurred during the reading of the play list, the computer begins a loop that plays all the programs in the order specified by the program descriptions contained on the compressed audio CD-ROM. At a step 160, the computer calls a play program subroutine, described below, that plays the first program on the CD-ROM. At a step 162, it is determined whether any errors occurred during the playing of the first program. If not, the description of the next program description is read from the CD-ROM at a step 164, and processing returns to step 160 to play the next program. This process continues until every program on

the CD-ROM has been played or an error occurs, in which case processing jumps to a step 166 whereby the CD-ROM player is shut down and processing halts at a step 168.

The steps performed by the computer in the play program subroutine are shown in FIGURE 4B. Beginning with a step 180, the computer analyzes the program definition including an identification number of the program, a title of the program, the program play type (either continuous or sequential), the maximum play time of the program (in minutes), the song play type (either sequential or random), and the list of audio files to be played including the identification number that identifies the corresponding compressed audio file, the title, and artist. In addition, a timer within the computer system that marks the playing time of the program is started.

Once the computer has read the list of audio files that are to be played in the program, a particular audio file is read from the CD-ROM at a step 182. At a step 184, the audio file is transferred to the MPEG decoder that begins decompressing the file and converting the digitized audio to an analog signal that is fed to an amplification system and speakers. At a step 186, the computer determines whether an audio file is playing. If so, the computer checks the status of the switches 118 that are connected to the computer. Any commands entered by the switches are then processed at a step 190. Processing then returns to step 186, until the audio file is finished playing.

Once the audio file is finished playing, the computer determines whether all songs in a program have been played at a step 192. If so, the computer determines whether the program play type is continuous at a step 194. If so, processing then returns to step 180 and the program is played again. If the program play type is not continuous, then processing proceeds to a step 196 that returns to step 160 shown in FIGURE 4A, so that the next program on the CD-ROM can be played.

If the answer to step 192 is no, and not all audio files that comprise the program have been played, the computer then determines whether the maximum play time of the program has been exceeded at step 197. To do this, the computer reads the timer that was started at step 180 when the program was started. This timer records the total length of time that a particular program has been playing. For example, a particular program may contain only 90 minutes of recorded music and commercials/announcements. A user can repeat the audio files recorded for this program for four hours by setting the play type of the program to continuous and

setting the maximum play time to four hours. The computer system will continue to play the audio files in the program until the maximum play time is exceeded.

If the maximum play time is exceeded at step 197, then processing proceeds to step 196 and the next program will begin. If the answer to step 197 is no, and the maximum play time was not exceeded, the ID number of the next audio file in the program is obtained at a step 198 and processing returns to step 182 wherein the corresponding compressed audio file is read from the CD-ROM before being delivered to the MPEG decoder.

As can be seen from the above description, the present invention allows a user to create customizable, long-play recordings of songs and commercials/announcements that meet particular criteria. Because the CD-ROM contains a description of the order in which the programs are to be played and the length of each program, the user does not have to continuously monitor the operation of the background music system or program a player.

While the present invention has been described with respect to its preferred embodiments, those skilled in the art will recognize that changes may be made to the invention without departing from the spirit and scope thereof. For example, although the present invention currently utilizes CD-ROMs to carry the encoded MPEG data, other means such as digital audio tape could also be used. In addition, each program could be made to begin playing at a specified time by including a start time in the program description. The computer would be programmed to compare the time of an internal clock to the start time set forth on the CD-ROM and begin playing the program at the appropriate time. Of course, the user would need to set the clock contained in the computer to the correct time using the switches 118 shown in FIGURE 3.

Another advantage of the present invention is that the computer system can play any program or specific audio file on command. For example, the computer within the CD-ROM player can be interfaced with a fire alarm system so that in the event of a fire, a program containing the audio files with emergency instructions are played. It is therefore intended that the scope of the invention be determined solely from the following claims and the equivalents thereto.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A system for creating customized audio recordings, including:

a computer system that classifies a library of prerecorded, compressed audio files by a number of criteria that can be selected by a user,

a computer program running on the computer system that lets a user select the criteria of the audio data to be recorded, wherein the computer program searches a database for audio files that match the selected criteria;

a CD-ROM writer coupled to the computer system for transferring prerecorded compressed audio files matching the song files selected by the computer system to a CD-ROM, the computer system also placing on the CD-ROM a description of an order in which the compressed audio files are to be played; and

a CD-ROM player that receives the CD-ROM and decompresses the audio files in the order described on the CD-ROM.

2. The system for creating customized audio recordings, according to Claim 1, wherein the compressed audio files on the CD-ROM are arranged in one or more programs, each program including one or more compressed audio files, wherein the description of the order in which the audio files are to be played includes a description of the order in which the one or more programs are to be played.

3. The system for creating customized audio recordings, according to Claim 2, wherein the description of the order in which the audio files are to be played includes an indication of a maximum length of time for which the audio files for a program are to be played.

4. The system for creating customized audio recordings according to Claim 3, wherein the CD-ROM player comprises a CD-ROM reader, a computer and a decoder for decoding the compressed audio files, the computer including a timer that is started when a program in the CD-ROM begins playing and wherein the computer plays audio files in a programs repeatedly until the maximum length of time for which the audio files for a program are to be played is exceeded.

5. The system for creating customized audio recordings, according to Claim 2, wherein the description of the order in which the audio files are to be played

includes an indication of whether the audio files in a program are to be played sequentially or randomly.

6. The system for creating customized audio recordings, according to Claim 2, wherein the description of the order in which the audio files are to be played includes an indication of whether the audio files in a program are to be played continuously.

7. The system for creating customized audio recordings according to Claim 1, further comprising:

a system for creating the compressed audio files including:

means for playing a stereophonic audio recording;

processing means for converting the stereophonic audio recording into a monophonic audio recording, for leveling and limiting the monophonic audio recording;

an analog to digital converter for sampling the processed, monophonic audio recording; and

a compressor for compressing the sampled processed, monophonic audio recording.

8. The system for creating customized audio recordings according to Claim 7, wherein the compressor comprises an MPEG encoder.

9. A compressed audio disk player, comprising:

a CD-ROM having a number of compressed audio files stored thereon, the CD-ROM also including a time at which an audio file is to be played;

a CD-ROM player that reads the compressed audio files from the CD-ROM and decompresses the audio files;

a computer system that controls the CD-ROM player, the computer system including a clock circuit that provides a current time, the computer system being programmed to compare the current time with a time specified on the CD-ROM in order to actuate the CD-ROM player to play an audio file at the time specified.

10. The compressed audio disk player of Claim 9, wherein the compressed audio files are arranged into one or more programs each of which includes one or

more compressed audio files, the CD-ROM also including a description of an order in which the audio files in a program are to be played.

11. The compressed audio disk player of Claim 9, wherein the compressed audio files are arranged into one or more programs each of which includes one or more compressed audio files, the CD-ROM also including a description of an order in which the audio files in a program are to be played.

12. The compressed audio disk player of Claim 10, wherein the CD-ROM includes a maximum time for which the audio files in program are to be played.

13. The compressed audio disk player of Claim 10, wherein the CD-ROM includes an indication of whether the audio files in a program are to be played continuously.

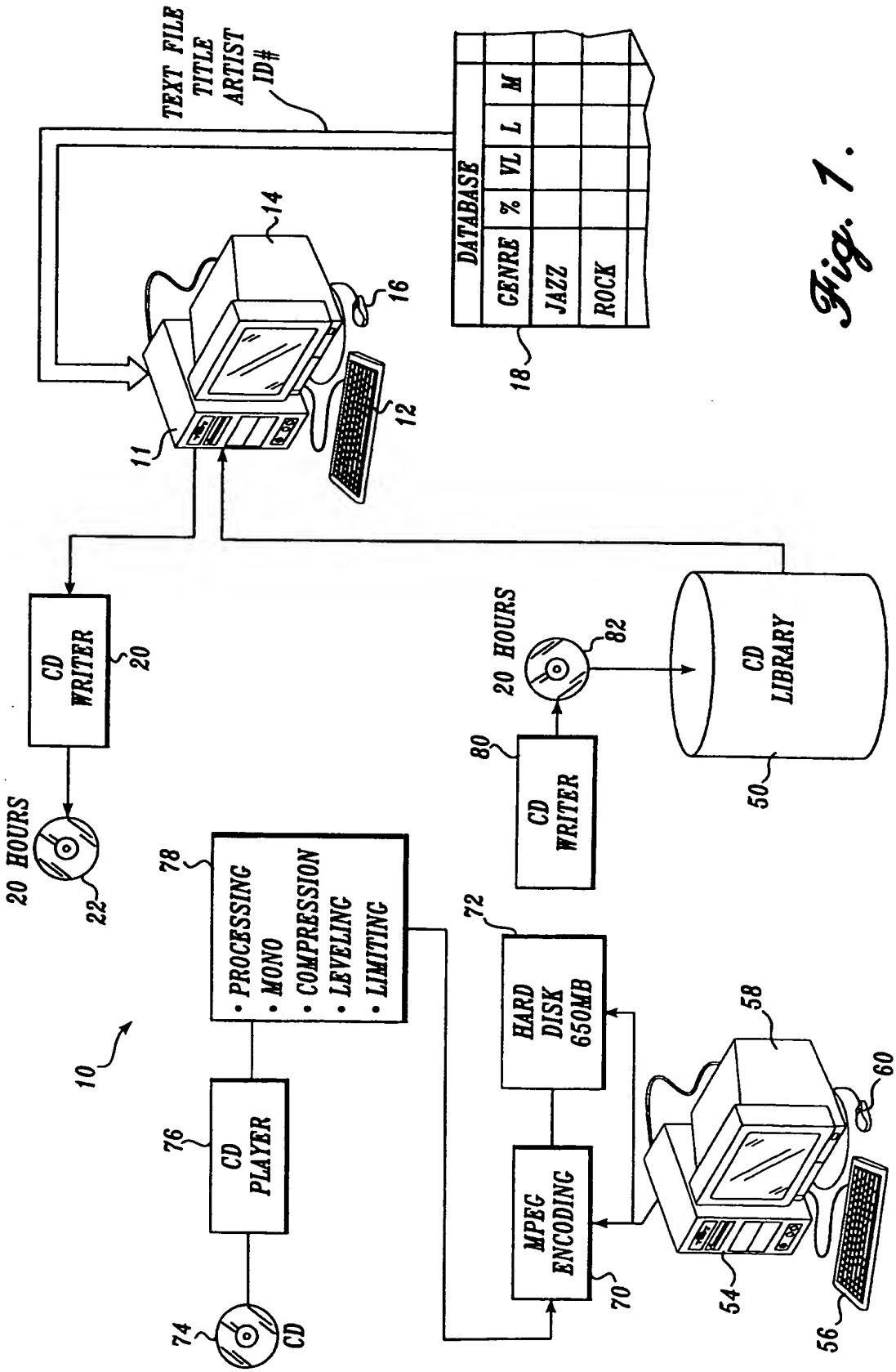

TEXT FILE
TITLE
ARTIST
ID#
DATABASE
CENRE
%
VL
L
M
JAZZ
ROCK
18
14
16
12
11
CD WRITER
20
20 HOURS
22
CD WRITER
80
20 HOURS
82
CD LIBRARY
50
78
• PROCESSING
• MONO
• COMPRESSION
• LEVELING
• LIMITING
72
HARD DISK 650MB
58
60
10
76
CD PLAYER
74
CD
MPEG ENCODING
70
54
56

Fig. 1.

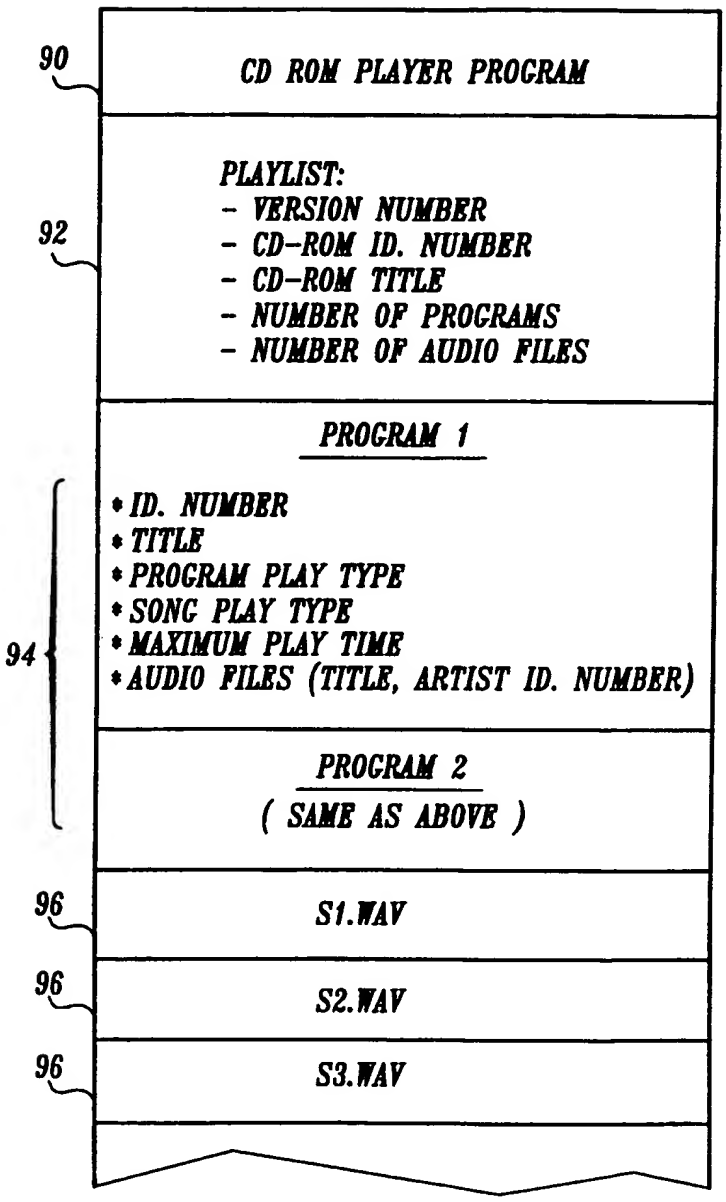

90
CD ROM PLAYER PROGRAM
92
PLAYLIST:
- VERSION NUMBER
- CD-ROM ID. NUMBER
- CD-ROM TITLE
- NUMBER OF PROGRAMS
- NUMBER OF AUDIO FILES
PROGRAM 1
94
• ID. NUMBER
• TITLE
• PROGRAM PLAY TYPE
• SONG PLAY TYPE
• MAXIMUM PLAY TIME
• AUDIO FILES (TITLE, ARTIST ID. NUMBER)
PROGRAM 2
(SAME AS ABOVE)
96
S1.WAV
96
S2.WAV
96
S3.WAV

Fig. 2.

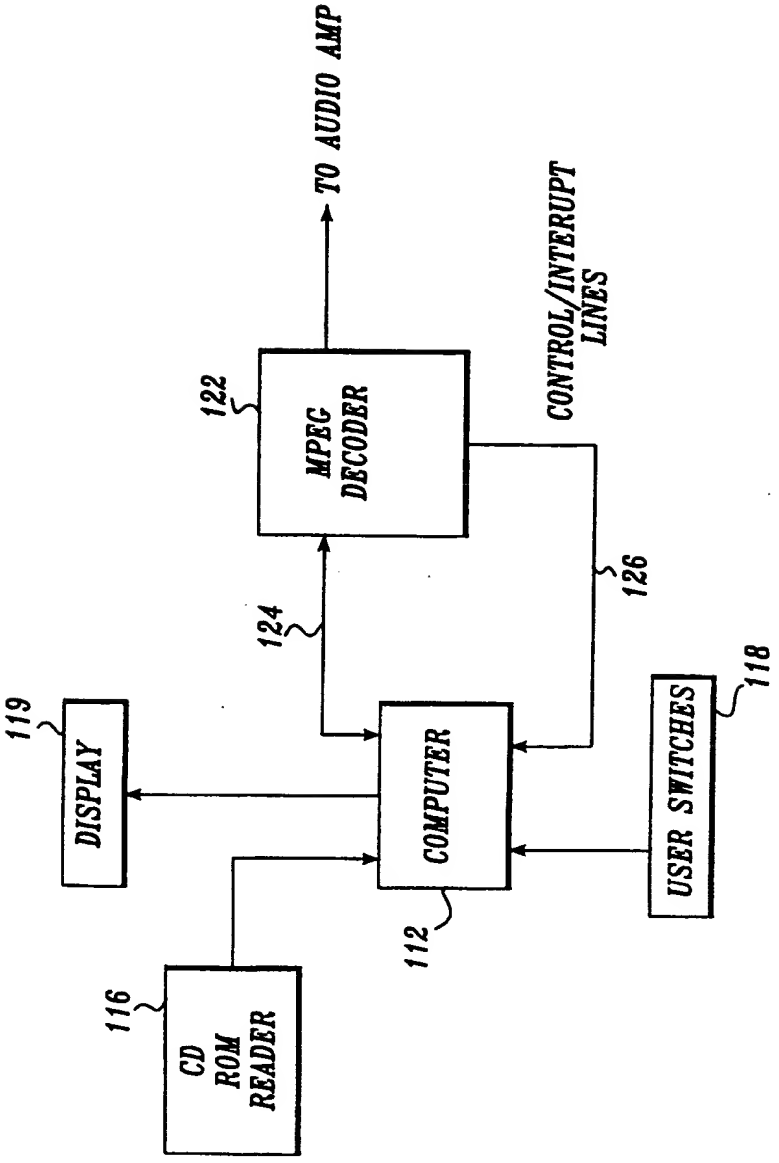

TO AUDIO AMP
CONTROL/INTERUPT LINES
122
MPEG DECODER
126
124
119
DISPLAY
COMPUTER
USER SWITCHES
118
112
116
CD ROM READER

Fig. 3.

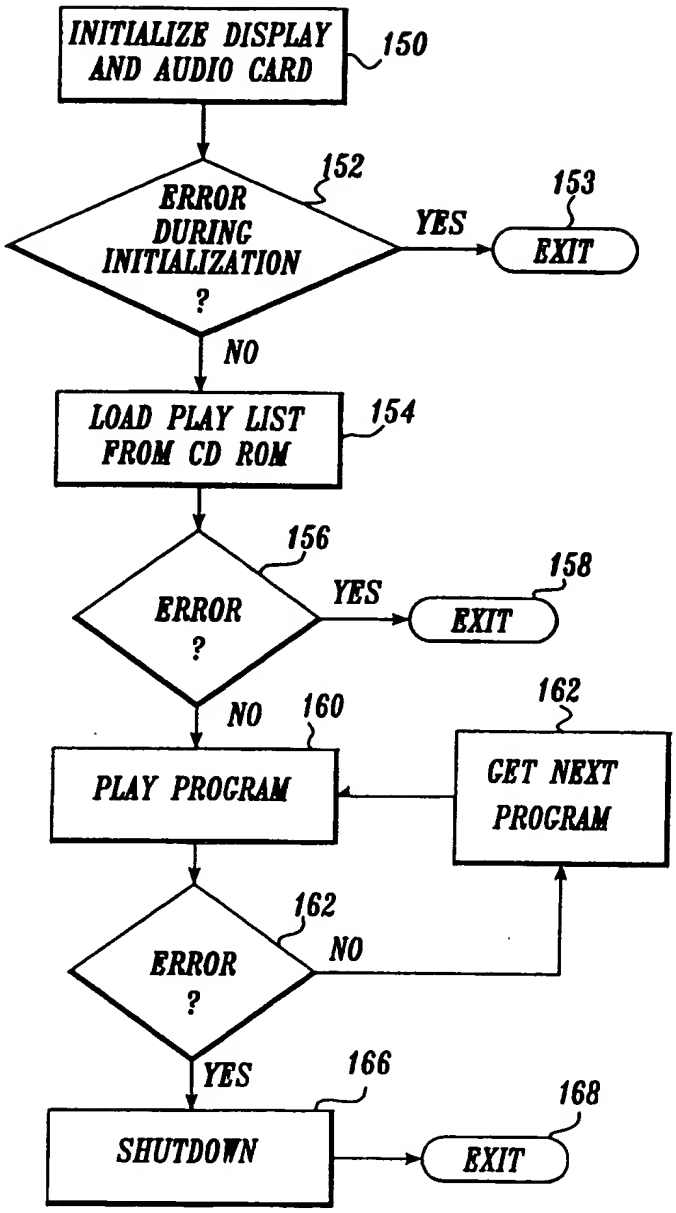
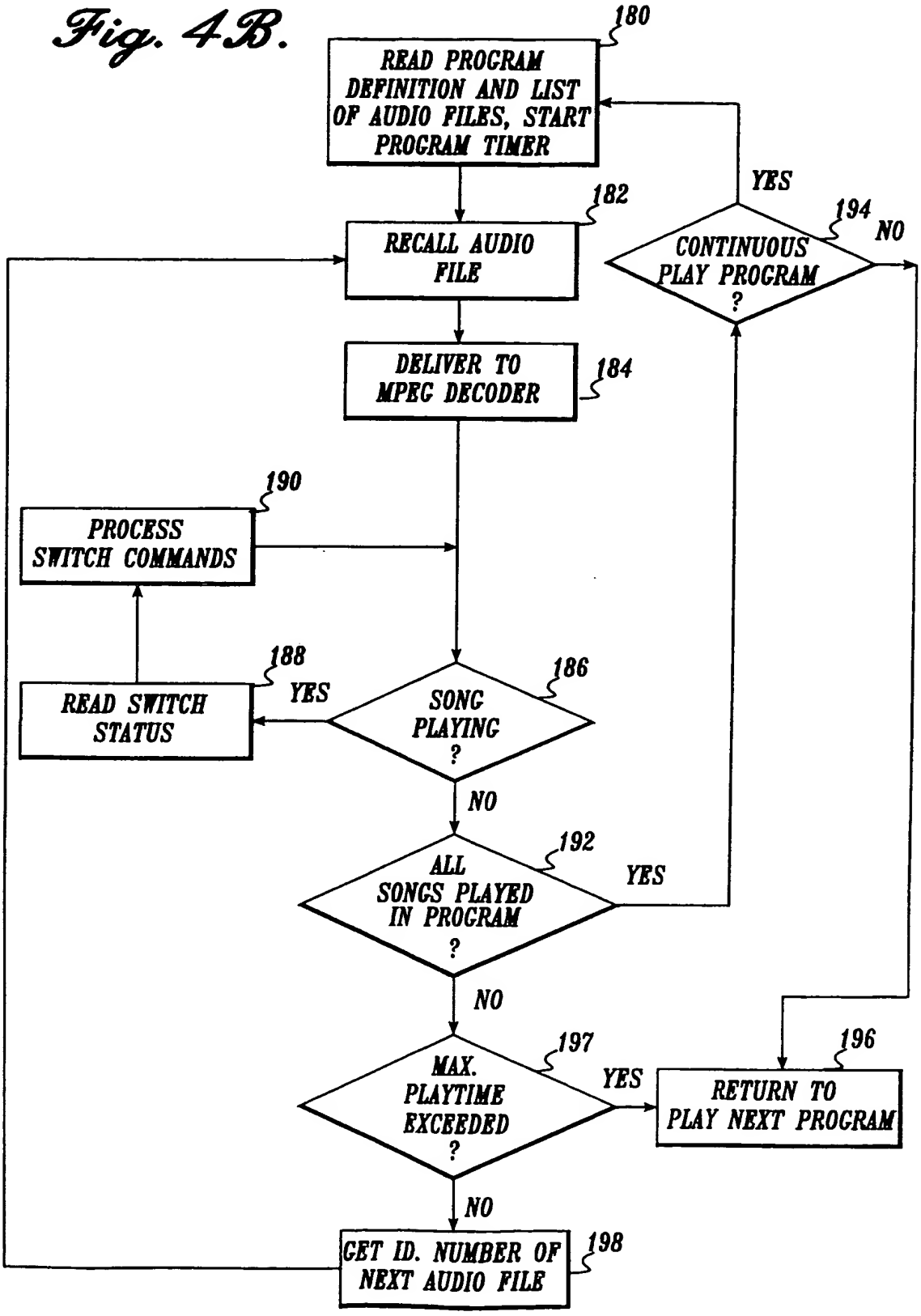

INITIALIZE DISPLAY AND AUDIO CARD
150
ERROR DURING INITIALIZATION ?
152
YES
153
EXIT
NO
LOAD PLAY LIST FROM CD ROM
154
ERROR ?
156
YES
158
EXIT
NO
160
PLAY PROGRAM
162
GET NEXT PROGRAM
ERROR ?
162
NO
YES
166
SHUTDOWN
168
EXIT

Fig. 4A.

Fig. 4B.


180
READ PROGRAM DEFINITION AND LIST OF AUDIO FILES, START PROGRAM TIMER
182
RECALL AUDIO FILE
184
DELIVER TO MPEG DECODER
190
PROCESS SWITCH COMMANDS
188
READ SWITCH STATUS
YES
186
SONG PLAYING ?
NO
192
ALL SONGS PLAYED IN PROGRAM ?
YES
NO
197
MAX. PLAYTIME EXCEEDED ?
YES
NO
198
GET ID. NUMBER OF NEXT AUDIO FILE
194
CONTINUOUS PLAY PROGRAM ?
YES
NO
196
RETURN TO PLAY NEXT PROGRAM

US006192340B1

(12) **United States Patent**
Abecassis

(10) **Patent No.: US 6,192,340 B1**
(45) **Date of Patent: Feb. 20, 2001**

(3)

(54) **INTEGRATION OF MUSIC FROM A PERSONAL LIBRARY WITH REAL-TIME INFORMATION**

(76) Inventor: **Max Abecassis**, 3207 Clint Moore Rd. #205, Boca Raton, FL (US) 33496

(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

(21) Appl. No.: **09/420,852**

(22) Filed: **Oct. 19, 1999**

(51) **Int. Cl.**[7] **G10L 11/00**; H04H 7/00; H04B 1/18; H04M 3/00

(52) **U.S. Cl.** **704/270**; 704/275; 455/6.3; 455/418; 455/185.1

(58) **Field of Search** 704/200, 270, 704/500, 503, 272, 275; 455/6.3, 418, 185.1

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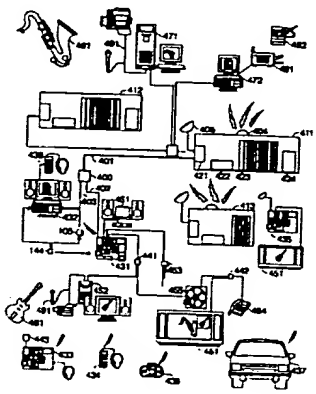
Primary Examiner—Talivaldis I. Šmits
Assistant Examiner—Daniel A. Nolan

(57) **ABSTRACT**

An apparatus capable of, and a method of, playing audio, the apparatus comprising communicating, processing, and playing means for, and the method comprising the steps of: communicating a user's information preferences to an information provider; receiving, from the information provider, informational items that are responsive to the user's information references; interleaving and sequencing, for the user, a playing of the received informational items with a playing of a plurality of musical items included in an audio library of the user; and playing, for the user and responsive to the interleaving and sequencing, the received informational items within a playing of the plurality of musical items; and wherein the playing comprises a voice synthesizing of an at least one of informational item; wherein the playing is responsive to a schedule preferences of the user; wherein a verified apparent listening of a playing of an informational item is associated with a credit; and/or wherein a user's reception of a communication unrelated to the informational items is integrated within a playing of musical items.

20 Claims, 11 Drawing Sheets



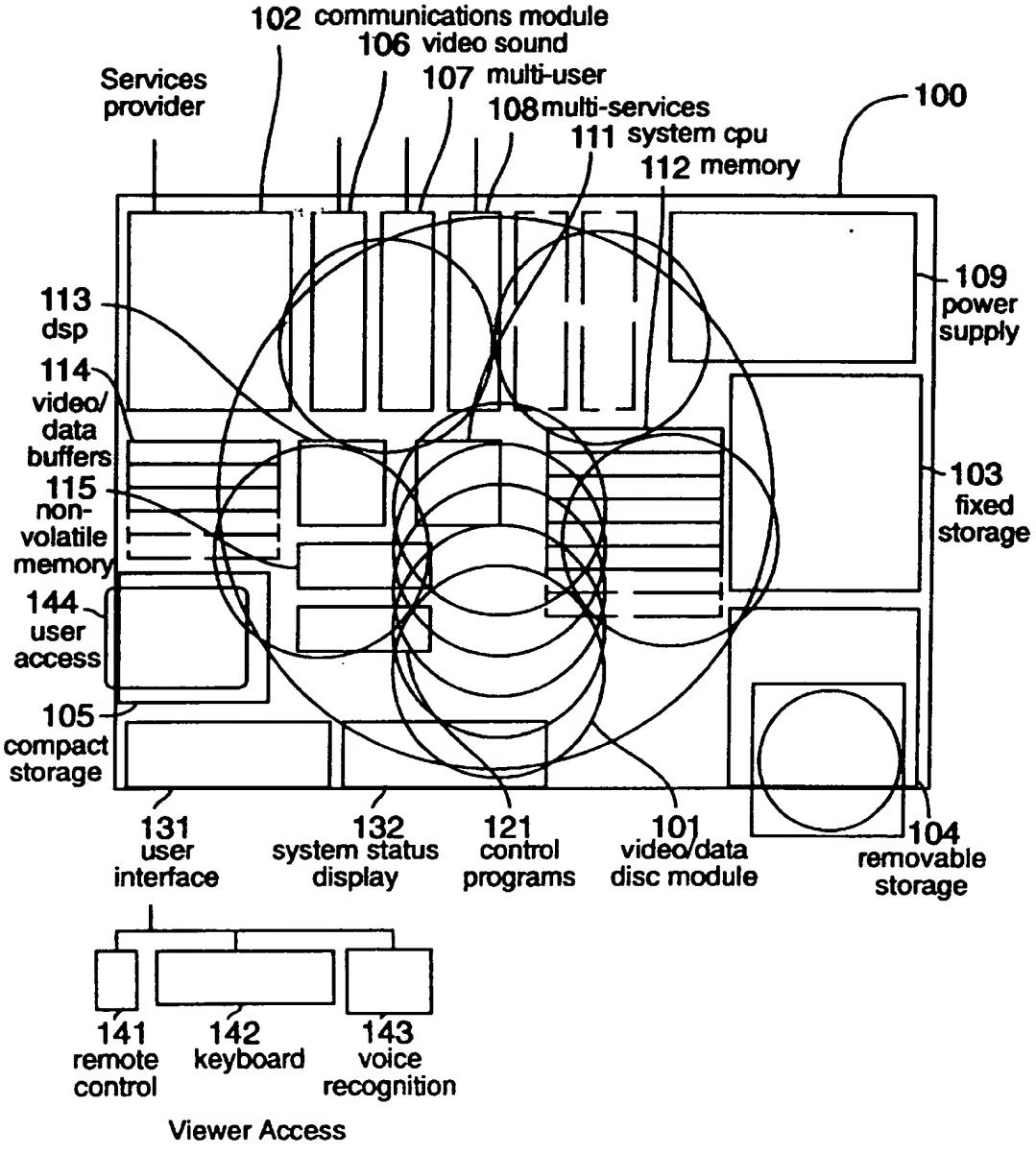

102 communications module
106 video sound
107 multi-user
108 multi-services
111 system cpu
112 memory
Services provider
100
109 power supply
113 dsp
114 video/ data buffers
115 non-volatile memory
103 fixed storage
144 user access
105 compact storage
131 user interface
132 system status display
121 control programs
101 video/data disc module
104 removable storage
141 remote control
142 keyboard
143 voice recognition
Viewer Access

FIG. 1

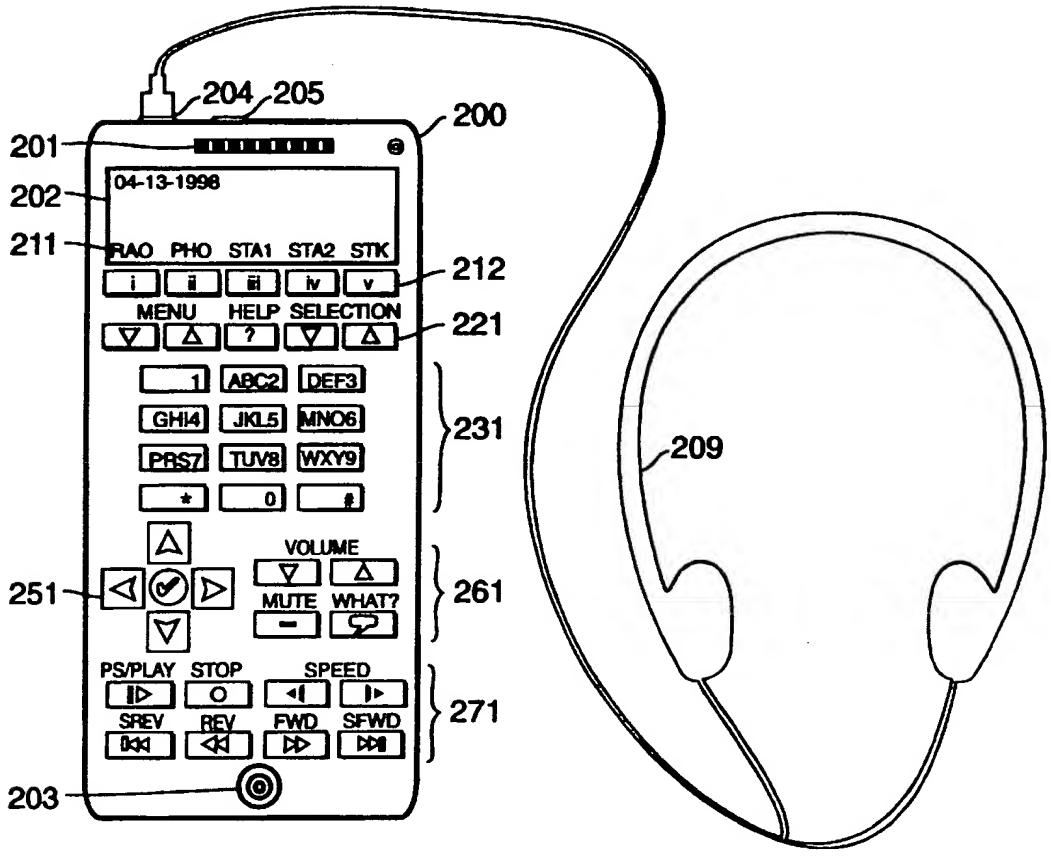

204
205
200
201
202
211
04-13-1998
RAO PHO STA1 STA2 STK
i ii iii iv v
212
MENU HELP SELECTION
221
1 ABC2 DEF3
GHI4 JKL5 MNO6
PRS7 TUV8 WXY9
* 0 #
231
209
VOLUME
251
MUTE WHAT?
261
PS/PLAY STOP SPEED
SREV REV FWD SFWD
271
203

FIG. 2

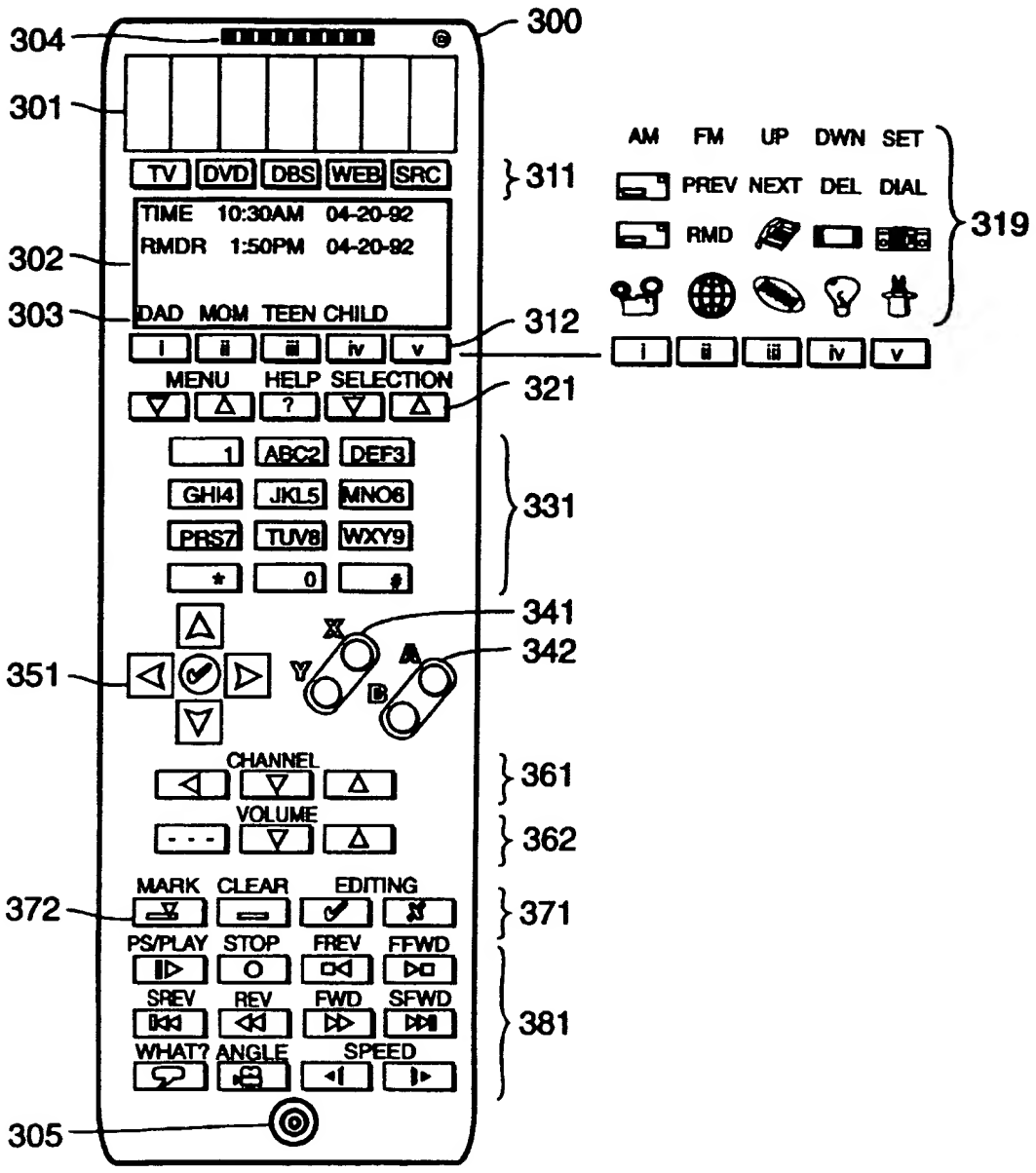

304
300
301
TV DVD DBS WEB SRC
311
TIME 10:30AM 04-20-92
RMDR 1:50PM 04-20-92
302
303
DAD MOM TEEN CHILD
312
i ii iii iv v
MENU HELP SELECTION
321
1 ABC2 DEF3
GHI4 JKL5 MNO6
PRS7 TUV8 WXY9
* 0 #
331
341
342
351
CHANNEL
361
VOLUME
362
MARK CLEAR EDITING
372
371
PS/PLAY STOP FREV FFWD
SREV REV FWD SFWD
WHAT? ANGLE SPEED
381
305
AM FM UP DWN SET
PREV NEXT DEL DIAL
RMD
319
i ii iii iv v

FIG. 3

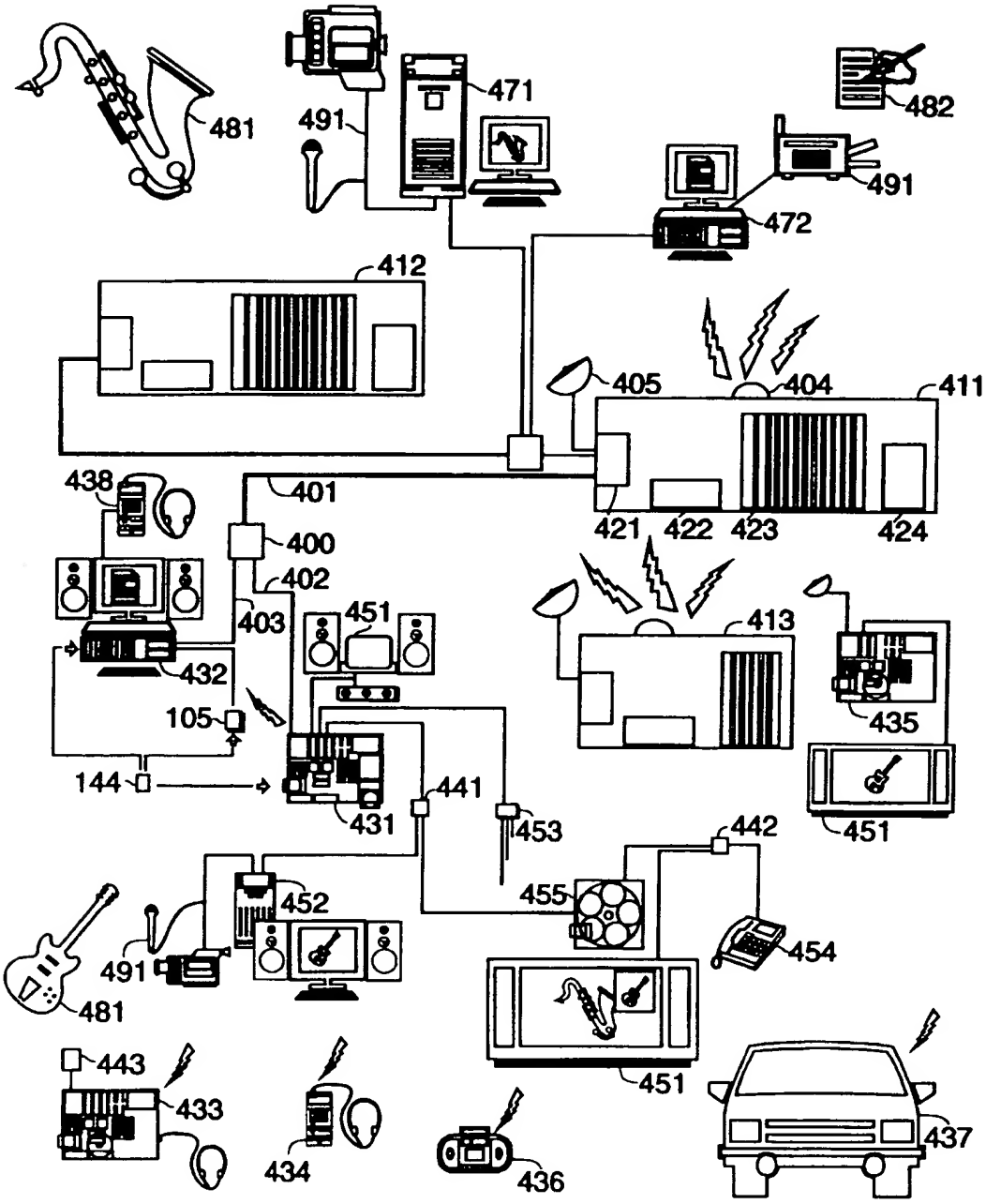

481
491
471
482
491
472
412
405
404
411
438
401
400
421
422
423
424
402
403
451
413
432
435
105
144
441
431
453
451
442
452
455
491
454
481
443
433
434
436
451
437

FIG. 4

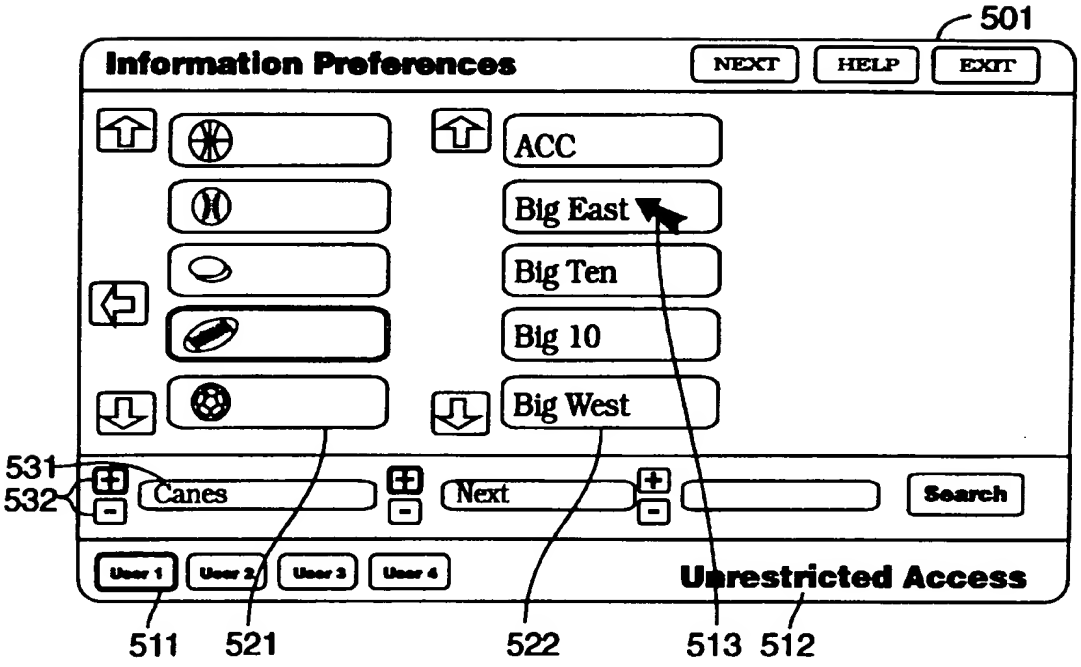

501
Information Preferences
NEXT
HELP
EXIT
ACC
Big East
Big Ten
Big 10
Big West
531
532
Canes
Next
Search
User 1
User 2
User 3
User 4
Unrestricted Access
511
521
522
513
512

FIG. 5

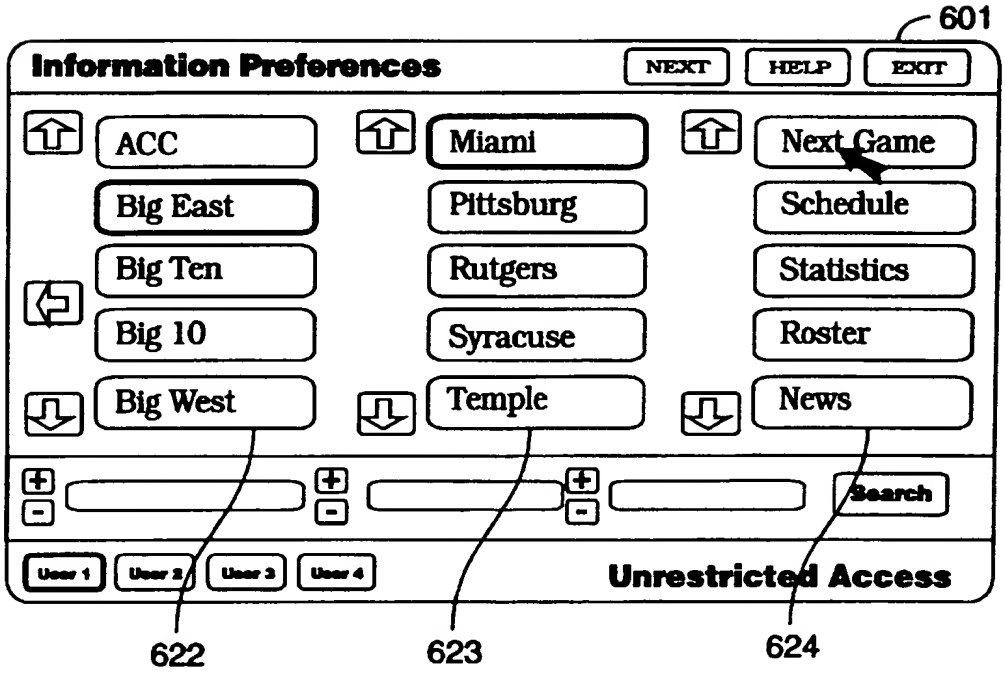

601
Information Preferences
NEXT
HELP
EXIT
ACC
Big East
Big Ten
Big 10
Big West
Miami
Pittsburg
Rutgers
Syracuse
Temple
Next Game
Schedule
Statistics
Roster
News
Search
User 1
User 2
User 3
User 4
Unrestricted Access
622
623
624

FIG. 6

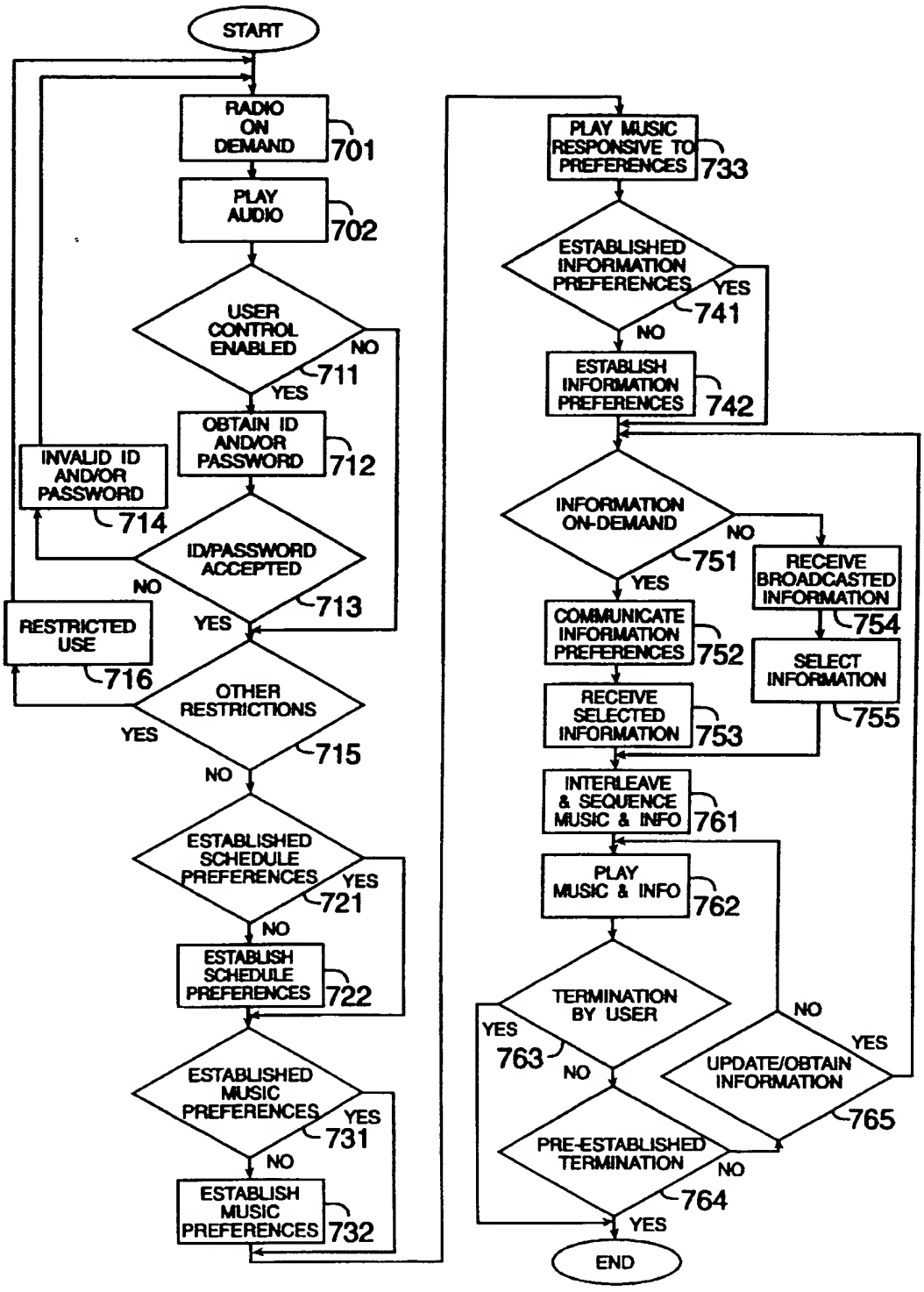

START
RADIO ON DEMAND
701
PLAY AUDIO
702
USER CONTROL ENABLED
NO
711
YES
OBTAIN ID AND/OR PASSWORD
712
INVALID ID AND/OR PASSWORD
714
ID/PASSWORD ACCEPTED
713
NO
YES
RESTRICTED USE
716
OTHER RESTRICTIONS
715
YES
NO
ESTABLISHED SCHEDULE PREFERENCES
721
YES
NO
ESTABLISH SCHEDULE PREFERENCES
722
ESTABLISHED MUSIC PREFERENCES
731
YES
NO
ESTABLISH MUSIC PREFERENCES
732
PLAY MUSIC RESPONSIVE TO PREFERENCES
733
ESTABLISHED INFORMATION PREFERENCES
741
YES
NO
ESTABLISH INFORMATION PREFERENCES
742
INFORMATION ON-DEMAND
751
NO
YES
RECEIVE BROADCASTED INFORMATION
754
COMMUNICATE INFORMATION PREFERENCES
752
SELECT INFORMATION
755
RECEIVE SELECTED INFORMATION
753
INTERLEAVE & SEQUENCE MUSIC & INFO
761
PLAY MUSIC & INFO
762
TERMINATION BY USER
YES
763
NO
NO
YES
UPDATE/OBTAIN INFORMATION
765
PRE-ESTABLISHED TERMINATION
NO
764
YES
END

FIG. 7

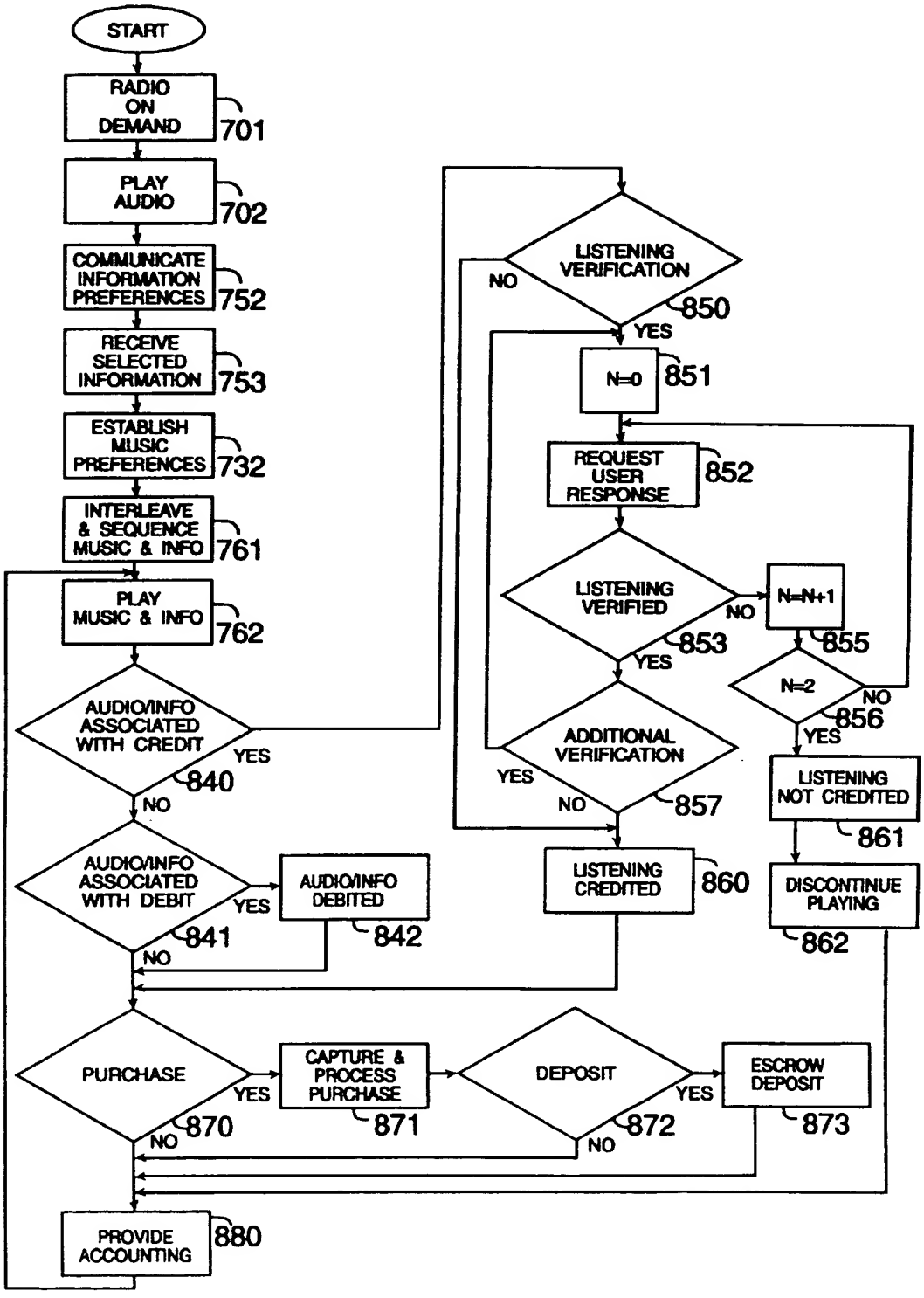

START
RADIO ON DEMAND
701
PLAY AUDIO
702
COMMUNICATE INFORMATION PREFERENCES
752
RECEIVE SELECTED INFORMATION
753
ESTABLISH MUSIC PREFERENCES
732
INTERLEAVE & SEQUENCE MUSIC & INFO
761
PLAY MUSIC & INFO
762
AUDIO/INFO ASSOCIATED WITH CREDIT
840
YES
NO
AUDIO/INFO ASSOCIATED WITH DEBIT
841
YES
NO
AUDIO/INFO DEBITED
842
PURCHASE
870
YES
NO
CAPTURE & PROCESS PURCHASE
871
DEPOSIT
872
YES
NO
ESCROW DEPOSIT
873
PROVIDE ACCOUNTING
880
LISTENING VERIFICATION
850
NO
YES
N=0
851
REQUEST USER RESPONSE
852
LISTENING VERIFIED
853
NO
YES
N=N+1
855
N=2
856
NO
YES
ADDITIONAL VERIFICATION
857
YES
NO
LISTENING CREDITED
860
LISTENING NOT CREDITED
861
DISCONTINUE PLAYING
862

FIG. 8

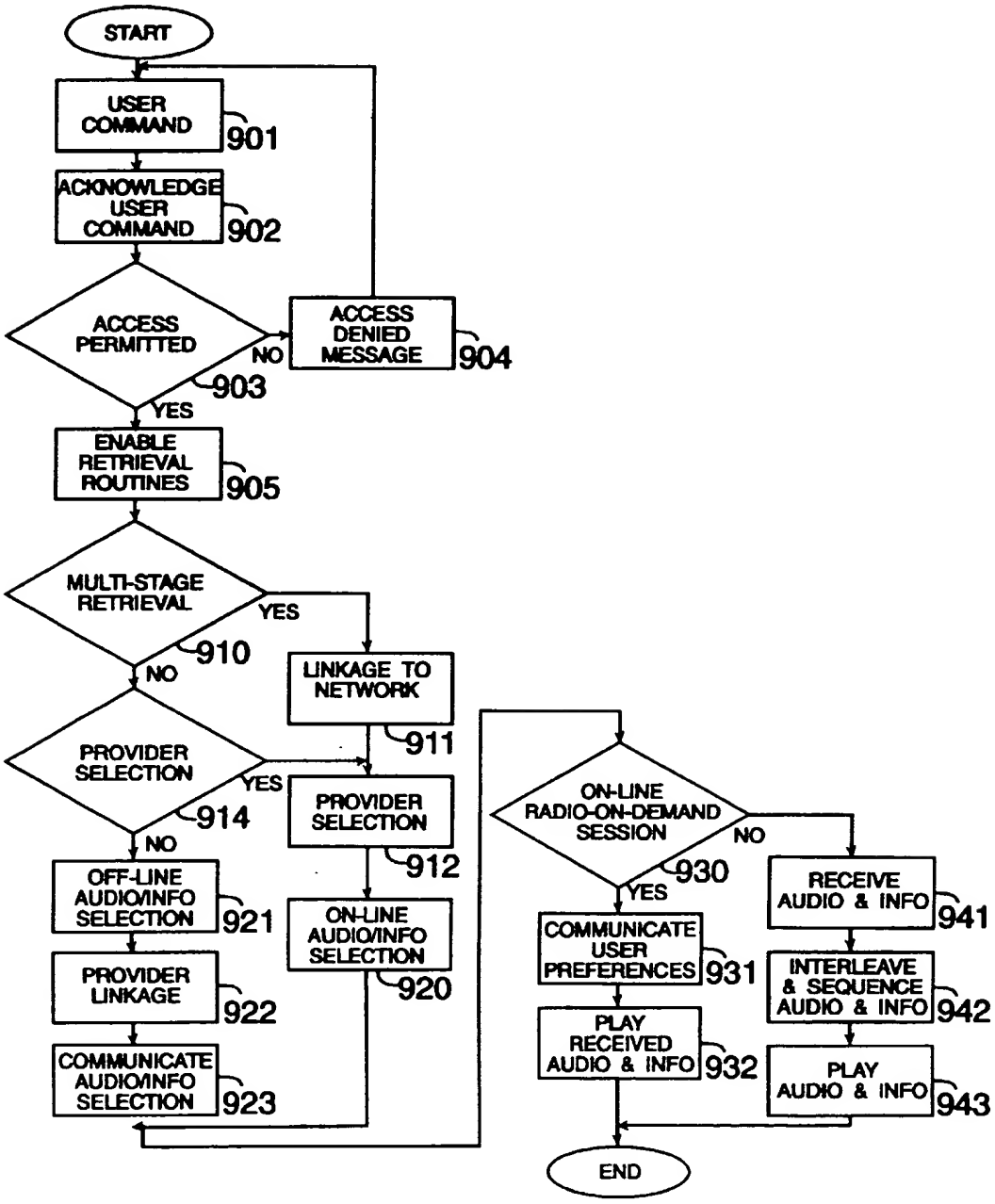

START
USER COMMAND
901
ACKNOWLEDGE USER COMMAND
902
ACCESS PERMITTED
NO
903
ACCESS DENIED MESSAGE
904
YES
ENABLE RETRIEVAL ROUTINES
905
MULTI-STAGE RETRIEVAL
YES
910
NO
LINKAGE TO NETWORK
911
PROVIDER SELECTION
YES
914
NO
PROVIDER SELECTION
912
OFF-LINE AUDIO/INFO SELECTION
921
ON-LINE AUDIO/INFO SELECTION
920
PROVIDER LINKAGE
922
COMMUNICATE AUDIO/INFO SELECTION
923
ON-LINE RADIO-ON-DEMAND SESSION
NO
930
YES
RECEIVE AUDIO & INFO
941
COMMUNICATE USER PREFERENCES
931
INTERLEAVE & SEQUENCE AUDIO & INFO
942
PLAY RECEIVED AUDIO & INFO
932
PLAY AUDIO & INFO
943
END

FIG. 9

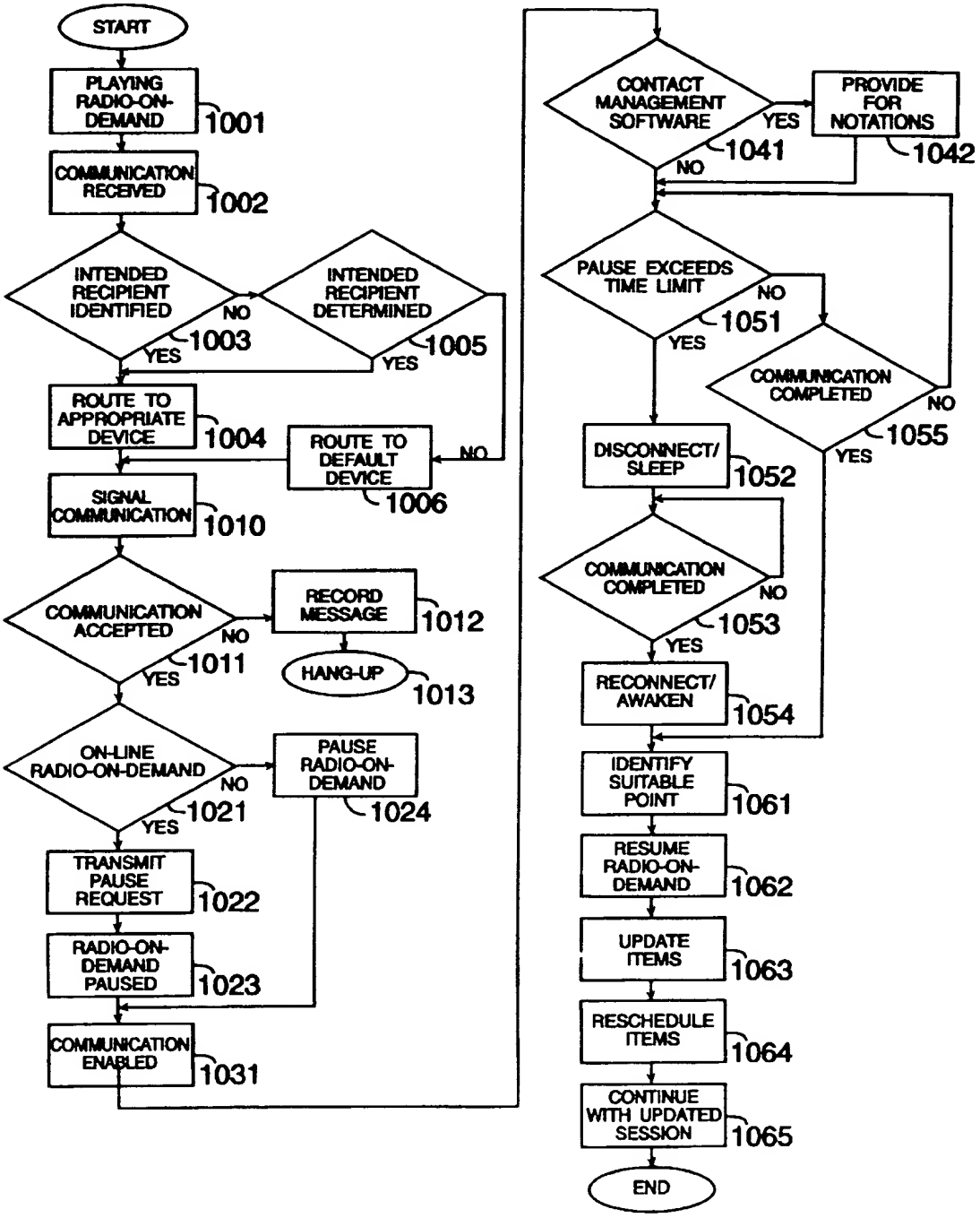

START
PLAYING RADIO-ON-DEMAND
1001
COMMUNICATION RECEIVED
1002
INTENDED RECIPIENT IDENTIFIED
NO
1003
YES
INTENDED RECIPIENT DETERMINED
1005
YES
ROUTE TO APPROPRIATE DEVICE
1004
ROUTE TO DEFAULT DEVICE
1006
NO
SIGNAL COMMUNICATION
1010
COMMUNICATION ACCEPTED
NO
1011
YES
RECORD MESSAGE
1012
HANG-UP
1013
ON-LINE RADIO-ON-DEMAND
NO
1021
YES
PAUSE RADIO-ON-DEMAND
1024
TRANSMIT PAUSE REQUEST
1022
RADIO-ON-DEMAND PAUSED
1023
COMMUNICATION ENABLED
1031
CONTACT MANAGEMENT SOFTWARE
YES
1041
NO
PROVIDE FOR NOTATIONS
1042
PAUSE EXCEEDS TIME LIMIT
NO
1051
YES
COMMUNICATION COMPLETED
NO
1055
YES
DISCONNECT/ SLEEP
1052
COMMUNICATION COMPLETED
NO
1053
YES
RECONNECT/ AWAKEN
1054
IDENTIFY SUITABLE POINT
1061
RESUME RADIO-ON-DEMAND
1062
UPDATE ITEMS
1063
RESCHEDULE ITEMS
1064
CONTINUE WITH UPDATED SESSION
1065
END

FIG. 10

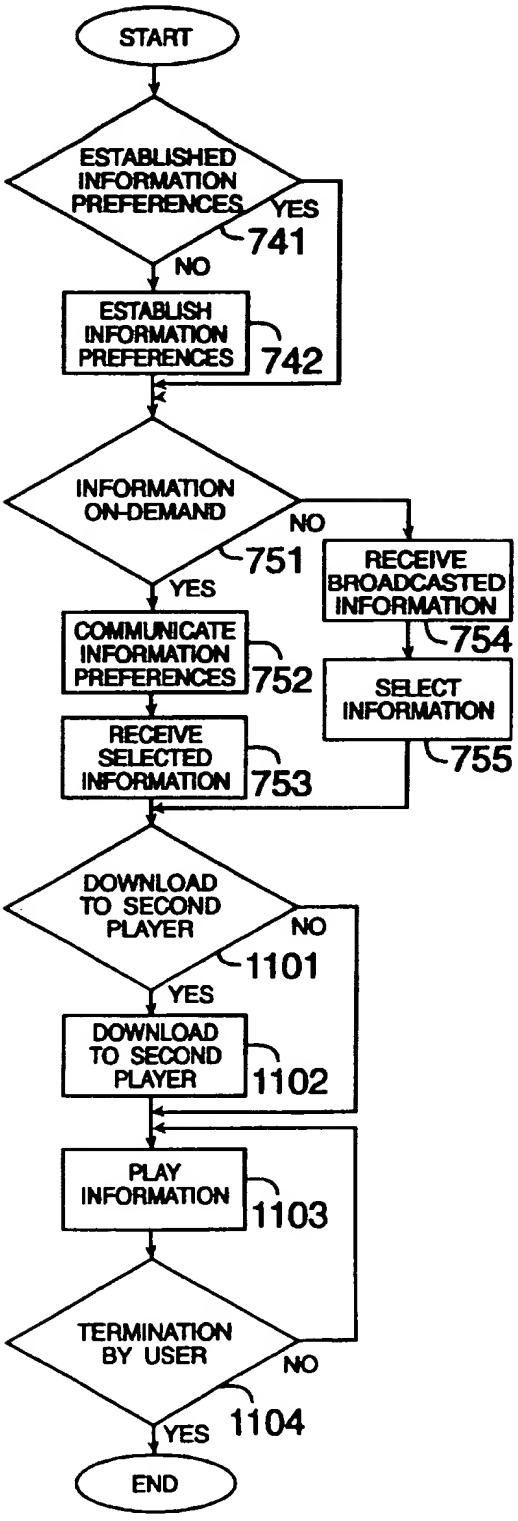

START
ESTABLISHED INFORMATION PREFERENCES
YES
741
NO
ESTABLISH INFORMATION PREFERENCES
742
INFORMATION ON-DEMAND
NO
751
YES
RECEIVE BROADCASTED INFORMATION
754
COMMUNICATE INFORMATION PREFERENCES
752
SELECT INFORMATION
755
RECEIVE SELECTED INFORMATION
753
DOWNLOAD TO SECOND PLAYER
NO
1101
YES
DOWNLOAD TO SECOND PLAYER
1102
PLAY INFORMATION
1103
TERMINATION BY USER
NO
1104
YES
END

FIG. 11

INTEGRATION OF MUSIC FROM A PERSONAL LIBRARY WITH REAL-TIME INFORMATION

BACKGROUND OF THE INVENTION

1. Field of the Invention

Systems for, and methods of, integrating a playing of music that is responsive to a user's music preferences applied to the user's audio library with a playing of real-time information that is responsive to the user's information preferences.

2. Description of the Related Art

A number of radio markets offer listeners a substantial variety of musical and/or informational radio broadcast formats. Real-time broadcasts offer the advantages of companionship, currency, and exposure to music not previously listened to by a particular listener. However, a broadcast, by definition, cannot intend to play a particular listener's favorite selection of songs or precisely the information that is of interest to that listener.

Clearly, systems that permit a user to play only the favorite songs from a library of music offer advantages of customized selection that cannot be duplicated by a broadcast format. Limiting the playing to songs from a personal library, also avoids having to listen to commercials, or to unsuitable or undesirable content. However, such systems do not provide, for example, news information, or the sense of currency and companionship that a real-time broadcast offers.

SUMMARY OF THE INVENTIONS

The term "audio" refers to any audible content, tone, or sound regardless of the source or technology implemented. Audio includes, for example, music, songs, tunes, tracks, titles, voice, speech, content similar to or analogous to content that may be provided by a broadcast radio station, and sounds including the unheard sound of a tree falling in the forest. Audio also comprises information that is associated with, may be associated with, or may serve to produce, an audible content. Audio may be part of, be extracted from, and/or be generated from, text, data, information, or video, e.g., a track from a DVD-Video. Audio may be part of, be extracted from, and/or be generated from video including, for example, still characters, graphics, images, motion pictures, films, interactive electronic games, and multimedia productions; music videos, full motion pictures, and television programming; and news, sports, cultural, entertainment, commercial, advertisements, instructional, and educational programming.

Audio may originate as, and/or be provided as, an analog or digital format, compressed or uncompressed, by a human voice or synthesized, naturally occurring, instrumental, or humanly, created, edited, or otherwise produced, and/or any combination thereof. The audio may be provided by a local source, e.g., storage, media, memory, device, CD, DVD-Audio, magnetic disk; by a remote source, e.g., radio broadcast, FM station, or "transmission"; and/or any combination thereof. A transmission may be provided by a private or public, broadcast or pointcast, wired or non-wired means and/or capability; and may utilize one or a hybrid combination of, for example, fiber optic cable, coaxial cable, twisted copper wire, cellular, radio, and/or satellite based technologies, systems, and infrastructures. In the broadest sense, a transmission also comprises the utilization of, for example, the U.S. Postal Service to deliver a CD.

The term "user" as used herein is meant to include and be interchangeable with the term "player" (when referring to a person), and is to be understood in the general sense of a person that may be utilizing, playing, and/or listening to audio.

The term "music preferences" refers, principally, although not exclusively, to a preference or preferences for audio which is musical in character, such as songs which may be played from a CD or listened to from an FM radio broadcast.

The term "information preferences" refers, principally, although not exclusively, to a preference or preferences for audio which is informational in character, such as the audio that is produced by an AM radio broadcast between the playing of songs, including, for example, information relating to the song being played, and/or news, weather, and traffic reports, jokes, quotes, inspirational or motivational messages, advertisements, and programming of a non-musical nature.

The term "schedule preferences" refers to a time based preference or preferences, such as when certain audio, music, and/or information is to be played.

The term "technical preferences" refers to a preference or preferences for, for example, the relative volume and playback speed of the different categories of information, and the voice to be utilized in the synthesizing of information.

The term "radio-on-demand" refers to audio played for a user and that is responsive to at least the user's music and information preferences. Radio-on-demand enables, for example, a user to enjoy the playing of songs selected from a CD album synergistically interleaved with a playing of synthesized real-time stock quotes for the user's stock portfolio. Radio-on-demand is not specific to any particular local and/or remote sources of audio.

The term "audio library" refers to a plurality of audio items. An audio library may contain the data, information, or content required to make audible the audio item ("physical audio item") and/or a link, pointer, address, or location to the data, information, or content required to make audible the audio item ("virtual audio item"). An audio library can comprise a plurality of audio items from a single source or from a plurality of local and remote sources. An audio library of a user can comprise, consist of, and/or be obtained from, for example,: i) selected audio items from a single optical memory, device, and/or disc such as a DVD; ii) selected audio items from a collection of CDs and DVDs; iii) audio items obtained, from a variety of local and remote sources and stored in, for example, the hard disk of a PC; iv) URLs of specific audio items retrievable from one or a plurality of web sites; and/or v) audio items downloaded from, captured, or otherwise obtained from, a broadcasted signal such as a transmission from an FM station or satellite.

Where not clearly and unambiguously inconsistent with the specific context, the above terms as defined above and as they may be more broadly defined below are to be given the broadest possible interpretation and not be limited in scope by any example. While a particular feature may be detailed with respect to a specified example or application, it is intended that the teachings herein be applied broadly and harmoniously across the many possible uses.

Accordingly, it is an object to communicate a user's information preferences to an information provider; receive, from the information provider, informational items that are responsive to the user's information preferences; interleave and sequence, for the user, a playing of the received informational items with a playing of a plurality of musical items

included in an audio library of the user; and play, for the user and responsive to the interleaving and sequencing, the received informational items within a playing of the plurality of musical items.

It is also an object to integrate informational items obtained from a radio broadcast with a playing of musical items obtained from a user's audio library.

It is also an object to incorporate a playing of audios obtained from a source other than the user's audio library, that are responsive to the user's music preferences, and that may be added, by the user, to the user's audio library.

It is also an object that an addition of an audio to a user's audio library be at no expense to the user, for a fee, or for such other consideration as may be required by a provider. Such consideration including, for example, the verified apparent listening or actual rejection of a targeted advertisement.

It is also an object to suspend a playing of information that would otherwise be responsive to a user's information preferences.

It is also an object that the radio-on-demand be immediately responsive to a user activating a play control corresponding to a specific information preference.

It is also an object to combine musical audio content with informational audio content and/or atmospherically audio content to provide a multi-layered audio.

It is also an object to prepare a transcript of each radio-on-demand session which may be utilized to replay the session, to edit the session and/or playlist, and/or utilized in a word processor for purposes which may not be related to the playing of audio, e.g., research on a topic.

It is also an object to provide radio-on-demand that also integrates a contemporaneous playing of user selected broadcasted programs.

It is also an object to integrate radio-on-demand with a receipt of a communication unrelated to the radio-on-demand.

Further, notwithstanding, the title and general focus of the disclosure, it is also a particular object of the inventions to enable the downloading of audio and/or information responsive to a user's information preferences from a remote source and in due course to a portable device for subsequent playing.

Briefly, these and other objects are enabled by, for example, an apparatus capable of, and a method of, playing audio, the apparatus comprising communicating, processing, and playing means for, and the method comprising the steps of: communicating a user's information preferences to an information provider; receiving, from the information provider, informational items that are responsive to the user's information references; interleaving and sequencing, for the user, a playing of the received informational items with a playing of a plurality of musical items included in an audio library of the user; and playing, for the user and responsive to the interleaving and sequencing, the received informational items within a playing of the plurality of musical items; and wherein the playing comprises a voice synthesizing of an at least one of informational item; wherein the playing is responsive to a schedule preferences of the user; wherein a verified apparent listening of a playing of an informational item is associated with a credit; and/or wherein a user's reception of a communication unrelated to the informational items is integrated within a playing of musical items.

These and other features, advantages, and objects, are apparent in the context of the detailed description, accompanying drawings, and appended claims, that follow.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram of a Multimedia Player capable of radio-on-demand;

FIG. **2** is a schematic diagram of a portable Multimedia Player capable of radio-on-demand;

FIG. **3** is an illustration of a remote control device for a Multimedia Player;

FIG. **4** is a diagram of an integrated communications network;

FIGS. **5** and **6** are illustrations of a graphical user interface to enable a user to establish preferences;

FIG. **7** is a flow chart detailing the steps of playing radio-on-demand;

FIG. **8** is a flow chart detailing the steps of playing radio-on-demand and of verifying and crediting an apparent listening of audio/info item;

FIG. **9** is a flow chart detailing the steps of retrieving audio/info from a provider; and

FIG. **10** is a flow chart detailing the steps of integrating a radio-on-demand session with a reception of a communication unrelated to the radio-on-demand session.

FIG. **11** is a flow chart detailing the steps of the downloading of audio and/or information responsive to a user's information preferences from a remote source and in due course to a portable device for subsequent playing.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following are incorporated by reference herein: i) U.S. Pat. No. 5,434,678, titled "Seamless Transmission Of Non-Sequential Video Segments" and U.S. Pat. No. 5,684,918, titled "System For Integrating Video And Communications" issued to Abecassis; ii) the capabilities, features, objects, and teachings of the "MusicMatch Jukebox" personal jukebox software program version 4.2 published by MusicMatch, Inc. and which was available during Sep. 28, 1999 at http://www.musicmatch.com, and related materials; the "REALPLAYER G2" and "REALJUKEBOX" software programs published by RealNetworks, Inc. and which were available during Oct. 6, 1999 at http://www.real.com, and related materials; iii) the capabilities, features, objects, and teachings of Diamond Multimedia Systems, Inc.'s RIO 500 portable digital audio player; iv) U.S. patents: U.S. Pat. No. 4,788,675 titled "Music Delivery System"; U.S. Pat. No. 5,524,051 titled "Method And System For Audio Information Dissemination Using Various Modes Of Transmission"; U.S. Pat. No. 5,539,635 titled "Radio Station Program Identifier And Distribution System"; U.S. Pat. No. 5,557,541 titled "Apparatus For Distributing Subscription And On-Demand Audio Programming"; U.S. Pat. No. 5,675,575 titled "Method And Apparatus For Communicating Different Types Of Data In A Data Stream"; U.S. Pat. No. 5,742,893 titled "Music-Playing System For A Motor Vehicle"; and U.S. Pat. No. 5,809,246 Titled "Selection And Retrieval Of Music From A Digital Database"; v) U.S. Pat. No. 5,299,125 titled "Natural Language Processing System And Method For Parsing A Plurality Of Input Symbol Sequences Into Syntactically Or Pragmatically Correct Word Messages"; U.S. Pat. No. 5,781,886 titled "Voice Response Apparatus; and U.S. Pat. No. 5,940,797 titled "Speech Synthesis Method Utilizing Auxiliary Information, Medium Recorded Thereon The Method And Apparatus Utilizing The Method"; and vi) U.S. Pat. No. 5,231,661 titled "Television Viewing Control Device And Method".

Apparatuses for integrating audio items from an audio library of a user with information that is responsive to the

user's information preferences include, for example, multimedia multi-source players ("Multimedia Players"). A Multimedia Player can comprise, for example, synergistic combinations of the functions, capabilities, and components found in consumer electronic systems including a DVD player (e.g. PIONEER's DVL-909 DVD/LD Player), a game system (e.g. SONY's PLAYSTATION II), a net surfboard (e.g. PHILIPS MAGNAVOX INTERNET TV TERMINAL), a direct broadcast satellite ("DBS") receiver (e.g. SONY's SAS-AD3 DIGITAL SATELLITE SYSTEM), a multimedia computing device (e.g. GATEWAY's DESTINATION DIGITAL MEDIA COMPUTER); a nonlinear editing system (e.g. AVID's MEDIA COMPOSER 9000); a set-top box capable of retrieving video-on-demand services from a remote video services provider (e.g. SCIENTIFIC-ATLANTA's EXPLORER 2000 digital set-top); and a digital audio player (e.g., the RIO 500 portable digital audio player); and the teachings of which are incorporated by reference herein.

Various configurations of Multimedia Players permit a user to obtain audio, videos, multimedia, and/or other content from storage means or sources within the Multimedia Player, sources locally accessible, and/or from remote sources.

FIG. **1** is a schematic diagram of a fully featured Multimedia Player **100** comprising the following primary modules and subsystems: i) random access multi-disc module (e.g. a multi-disc DVD read/write drive) **101**; ii) communications module **102**; iii) fixed storage subsystem **103**; iv) removable storage subsystem **104**; v) compact portable storage subsystem **105**; vi) external video/audio input/output support module **106**; vii) multi-user modules **107**; and viii) multi-services modules **108**.

The random access multi-disc module **101** refers to any nonvolatile memory storage device principally utilized to randomly read/write and store significant quantities of information on a laser readable disc, preferably a multi-session rewritable disc.

In MP3 format a song averages approximately 2–3 MB, thus a single sided, double layered DVD could store approximately 3,000 songs. Even with higher audio quality requirements, forthcoming optical technology will provide discs with the potential to store even larger audio libraries. Thus a single laser readable disc could store a user's entire audio library. Similarly, hard disk drives with over 10 GB are now available at mass market price points, and thus they could also store a typical user's entire audio library.

The communications module **102** may be as simple as a modem card or device, or as sophisticated as may be required by a direct fiber optic access to a remote audio and communication services provider. The communications module may support a plurality and variety of cabling connections such as fiber optic cable, coaxial cable, and twisted pair copper wire, and the cabling required to access a variety of networks. Additionally, the communications module may support a plurality of broadcasts and pointcast audio and information delivery systems. In this fashion by merely depressing the appropriate keys in a remote control device a user can easily switch between off the air transmissions and on-line services. A Multimedia Player may be connected to a local receiving means such as an indoor antenna, an outdoor antenna, or an existing system, such as the electrical system, that may serve as an antenna.

The fixed storage subsystem **103** refers to any nonvolatile memory storage device principally utilized to randomly read/write and store significant quantities of information. An example of a fixed storage subsystem is a magnetic disk drive commonly found in a personal computer.

The removable storage subsystem **104** refers to any nonvolatile memory storage device that utilizes removable media. Examples of removable media for these storage subsystems are personal computer floppy disks, micro disks, tapes, and removable hard disks. The random access multi-disc module **101** is another example of a removable storage subsystem.

The compact portable storage subsystem **105** and user access media **144** is principally distinguished from a removable storage subsystem **104** by the size of the media and the greater variety of memory storage technologies that are generally implemented. However, removable storage media, such as for example a micro disk, are also considered user access media **144**. With present technology, user access media is available in dimensions similar to conventional credit cards. Examples of other removable storage media and user access media are laser read/write cards, in which at least one surface of the card permits a laser to read/write information; electronic cards, in which the information is stored in electronic components; solid-state memory products such as CompactFlash, SmartMedia, SanDisk (SD) Memory, Memory Stick; magnetic cards embodying magnetic storage technology, of which a credit card is an example, electronic cartridges commonly utilized in electronic video game systems, smart cards, and PCMCIA cards.

Clearly, a variety of memory devices are available utilizing technologies and combinations of technologies to suit particular performance requirements. The above classifications of the memory devices are directed at bringing attention to functional capabilities of a Multimedia Player rather than to a particular technology. The classifications are not intended to restrict a subsystem to a particular classification, limit the selection of subsystems which may be implemented, or to limit the function of the particular subsystem implemented.

It is intended that a full featured Multimedia Player "play" a variety of laser readable discs, such as, DVD-Video, DVD-ROM, DVD-Audio, CDs, photo CDs, in a conventional manner. The wide range of video/data discs that may be accommodated and the various configurations are diagrammatically emphasized in FIG. **1** as the five stacked circles and the five circles inside the representation of the video/data disc unit **101**.

The external video/audio input/output support module **106** supports video/audio/data transmission to the primary audio/video display system comprising, for example, a monitor/television, stereo system, and keyboard/voice recognition-response unit. Additionally, the input/output module supports video/audio input from local sources such as for example VCR's, cameras, and videophones. The construction of the external support module follows the conventional practices of consumer electronic products as for example: DVD players, VCRs, and personal computers.

Multi-user modules **107** principally support separate controlled independent access by a plurality of users of the Multimedia Player's resources. The construction of multi-user modules following established networking technologies.

In a preferred embodiment, instead of utilizing one of the Windows, Unix, and/or Linux operating systems, the Multimedia Player can incorporate a small footprint multi-user multi-tasking real-time operating system with a streamlined user interface patterned after, for example, the simpler interface of a DBS receiver. A multi-layer approach to the

functionality/complexity of such functions as surfing the net; contact management and email, DVD/Internet hybrid games, applications and services; video editing; multimedia and word processing; and portfolio management and banking, are made available at a streamlined level that provides functionality required by most users at a markedly reduced level of complexity. The interface of the cited Web TV is an example.

Multi-services modules **108** provide a host of services, such as for example residential security, and appliance operation management. The operation of the module being principally a software application running under the operating system implemented. The construction of the particular multi-service module being responsive to the particular application.

The Multimedia Player further comprises computing elements and audio/video processing elements readily found in multimedia devices and video electronic systems such as, for example, and not limitation, microprocessor **111**, memory units **112**, video processor or digital signal processor **113**, video, audio, and data buffers **114**, and nonvolatile memory **115**.

The video audio module or board **106** and the processor **113** comprise compression-decompression technologies to both retrieve and decompress, and compress and transmit. The compression technologies may include hardware, firmware, software, or any combination of these. One or a plurality of existing and forthcoming video compression methods may be implemented such as: Motion-JPEG, MPEG 1, MPEG 2, Fractals, and Wavelets. It should be appreciated that as more media becomes available in a digitally compressed format from a variety of sources, for example, DBS, DVD, digital camcorders, resident compression capability becomes less necessary.

A Multimedia Player's control programs that manage the Multimedia Player's resources, and the retrieval and processing of data and information, reside in dedicated chips **121**. Alternatively, or additionally, control programs are stored in mass memory devices **103** from installed or downloaded software, in removable storage media **104**, or in an user access media **144**.

A Multimedia Player's user control interface **131** includes communications to the buttons and keys located on the cabinet of the device, and to the associated control devices **141–142–143**. The keys, buttons, and switches, conventionally found in consumer electronic systems and deemed advantageous to the operation of the Multimedia Player may also be implemented. The user control interface **131** additionally supports infrared and/or RF remote control units **141** (e.g. numeric control pad, and keyboard with a touchpad); wire connected control units **142** (e.g. cable connected computer keyboard, mouse, and game controller); and a voice recognition unit **143**.

The keyboard, similar to a personal computer implementation, facilitates system setup, keyword retrieval, and system functions requiring the entry of alpha characters. Since a preferred configuration of a Multimedia Player comprises significant multimedia capabilities, a keyboard means is advantageous. A keyboard connector used to connect a standard AT keyboard or a dedicated keyboard is supplied. Alternatively, an infrared-based or radio-based keyboard is implemented.

Given the computing and storage capabilities of a Multimedia Player, a voice response subsystem option accommodating at least the few commands, such as play, stop, mute, audio, skip, required to control the basic operations can additionally be provided. The sophistication of the voice recognition capability can be enhanced as the hardware/software configuration of the Multimedia Player advances within mass market price points.

Implemented in the Multimedia Player is a digital system status display subsystem **132**, which provides visual feedback and system status information similar to the implementations in VCR and DVD devices.

In general, parts, subassemblies, and components of a Multimedia Player are of conventional characteristics and are freely substituted by like functioning elements and components. For example, and not limitation, while fiber optic-based communications are preferred, copper phone lines and coaxial cable-based communications are considered, albeit less capable, nonetheless, functional equivalents. Additionally, a certain degree of redundancy of components is illustrated in FIG. **1** to schematically show and detail significant functions.

In a preferred embodiment, redundant components in general, and redundant electronic components in particular, are eliminated. For example, while a Multimedia Player may include a removable storage subsystem and a compact memory subsystem, one or the other may be eliminated. In general, where cost effective, components and electronics are designed to serve a combination of functions.

Further, the configuration of the Multimedia Player's various modules, components, and subsystems, are intended to offer flexibility analogous to that found in a personal computer. Specifically with respect to the multi-user capabilities, a Multimedia Player may be configured, for example, with more than one DVD module, whether inside the primary cabinet, in a mating cabinet, and/or a sister cabinet. Various embodiments of Multimedia Players do not include all, or even most, of the means, and/or capabilities detailed herein. The particular configuration of a Multimedia Player is responsive to the particular function or functions desired. A Multimedia Player need not include anything more than is included in a PC equipped with a DVD-ROM drive and a modem, such as the NEC HOME MUSIC STUDIO from Packard Bell NEC's Consumer Division.

In a preferred embodiment of a Multimedia Player, every component and subsystem is added or replaced without resorting to screwdrivers and the need to unplug and plug communications and power cables. The motherboard and cabinet permitting the replacement of, for example, the power supply **109** just as easily as a battery is replaced in a portable personal computer.

FIG. **2** is a second example of a Multimedia Player, in this case, a portable compact digital radio-on-demand player similar to the RIO 500 portable digital audio player.

A portable Multimedia Player **200** comprises for example,: i) a communications module; ii) a fixed storage subsystem; and iii) an audio/data output module. In this example, of a portable Multimedia Player, the communications module supports cellular phone communications, the reception of broadcasted content, and communications with another multimedia player and access to a variety of communication networks; the fixed storage subsystem includes a memory storage principally utilized to randomly read/write and store significant quantities of information, e.g. 128 MB of ram; the audio/data input/output support module supports a built in speaker **201**, display screen **202**, and microphone **203**; audio output connector **204** to provide audio to external speakers or to a personal listening device, e.g., a headphone set **209**; and audio input connector **205** to receive audio from, for example, an external microphone.

The portable Multimedia Player's computing elements and audio processing elements include, for example, microprocessor, digital signal processor, and nonvolatile memory.

A portable Multimedia Player's control programs, that manage the retrieval and processing of audio and information, reside in part or in total in dedicated chips, in the fixed storage subsystem, and/or may be received by means of the communications module.

A portable Multimedia Player's user control interface includes the keys, buttons, and switches, conventionally found in portable audio capable consumer electronic products, such as, portable phones, radios, digital audio players, and remote control devices, and/or deemed advantageous to a playing of a radio-on-demand session.

The example of a portable Multimedia Player illustrated in FIG. 2. is shown to include a display screen **202** that labels **211** interactively defined function keys i-v **212** (the set of labels shown includes radio-on-demand RAO, phone PHO, a first pre-set radio station STA1, a second pre-set radio station STA2; and a stock quotation request STK); menu, help, and selections control keys **221**; telephonic alphanumeric key pad **231**; screen position and controls **251**; volume controls (Lower, Higher, Mute) and a What? request keys **261**; and play control keys (e.g. Pause/Play) **271**.

As configured, the portable Multimedia Player detailed with respect to FIG. 2, is intended to functions as a stand alone cellular phone, as a portable part of multiple-phone configuration, a radio, a remote control, as a digital audio player, and/or as a radio-on-demand player.

A remote control device to control the operation of a Multimedia Payer may be based on any number of technologies both wired and non-wired. For example, detailed with respect to FIG. 3, is a remote control device **300** comprising an optical power panels **301**; a display screen **302** that labels **303** interactively defined function keys i-v **312**; speaker **304**; microphone **305**; multimedia source selection/on-off keys (e.g. Broadcast TV, DVD, DVS, WEB, and other sources SRC) **311**; menu, help, and selections control keys **321**; telephonic alphanumeric key pad **331**; gaming controls **341–342**; screen position and menu controls **351**; channel controls (Last Channel, Up Channel, Down Channel) **361**; volume controls (Mute. Lower, Higher) **362**; edit controls keys **371**; and control keys (e.g. Pause/Play) **381**.

The interactively defined and labeled function keys i-v **312** permits a reduced set of function keys to provide access to individual sets of multiple functions for each of a plurality of users, as is suggested by the labels **303**. The function keys **312** also provide, for example, subject category selection, program selection, music and information preference selection, and source selection **319**. Pressing one of the i-v keys **312** results in an appropriate new menu of labels and/or icons to be displayed **303**.

In particular the interactively defined and labeled function keys may be automatically configured and reconfigured by a specific transmission or other information downloaded from, for example, the Multimedia Player. For example, when a specific user accesses the remote control, the display may show blinking icons for voicemail and email received for that individual.

The SFWD and SREV keys in the control key set **381**, in particular provide a user access to the functions that utilize the capabilities that are made possible by information relating to the audio. During a playing of a song, for example, pressing the SFWD key causes the termination of the playing of the current song, and the seamless playing of the next logical audio unit. The edit controls keys **371** permit flagging an audio unit during its playing. The exclude key permits automatically excluding, for example, the current song the next time the playlist is played. The include key is utilized to, for example, increase the frequency of, or reposition, an audio unit such as a traffic report. Advanced functions may suspend the playing of a specified information item, e.g. traffic reports, for specified periods, e.g., rest of day.

The MARK key **372** permits the user to define an audio unit. The first time the MARK key is pressed, it identifies the beginning point. The second time the MARK key is pressed, it identifies the end point. The editing keys would then be utilized to code the user defined audio unit. Additionally, interactively defined and labeled function keys; menu, help, and selections control keys; and alphanumeric key pad; can provide access to audio unit coding functions. The MARK key may be utilized to edit the contents of a program, for example cutting out a portion of the program and rescheduling the balance for later playing.

Keys may be labeled, and other keys found in the art may be added responsive to the particular requirements of the functions implemented. For example, shuttle controls may be provided alternatively to, or in addition to, the gaming control shown which can serve the functions provided by the shuttle controls. Other examples are suggested by the remote controls provided with the RCA's RC5200P DVD player, and the MITSUBISHI'S HS-U580 VCR.

Further, the capabilities, functions, keys and other elements of a remote control device may be synergistically integrated with a remote keyboard with integrated touch pad and/or pointing device. In such embodiments, the function keys or dedicated keys, for example, may be configured to provide direct access to the various functions. Further, the remote control device detailed with respect to FIG. 3 comprises all of the components and elements, e.g., a DSP and electronics, required to serve as a standalone portable phone for conventional phone communications, and/or as a communications capable remote control device synergistically integrated with the capabilities of the Multimedia Player. That is, the remote control can also directly receive from the Multimedia Player a transmission and render it audible for the user through its built-in speaker or by means of headphones connected to the remote control as previously detailed with respect to FIG. 2.

Audio, audio information, play routines specific to the audio, and control codes for automatically configuring or controlling the functions of the Multimedia Player may be provided by means of a variety of existing and evolving technologies. In addition to the hard formats such as tape, DVD, optical/magnetic disk, memory chips and modules (e.g. RAM, DRAM, high capacity flash memory, bubble memory), audio content may be provided by soft formats such as may be implemented in a variety of communications networks utilizing for example analog or digital cable transmissions, fiber optic transmission, phone communications, and/or satellite transmissions. A Multimedia Player need not be physically accessible by a user nor be physically located near the audio/video equipment. The Multimedia Player may provide a user access to remote resources and may itself be remotely controlled by the user. Fiber optic and coaxial communications easily permit the required transfer rates over long distances between controllers, Multimedia Players, and other sources. It is within a variety of network-based implementation, that the various advantages and capabilities of radio-on-demand are realized.

FIG. 4 is a schematic diagram of an audio and information network comprising a plurality of providers 411–413, and a plurality of end users 431–438. Participants in the network 400, however, whether classified as providers 411–413 or end user 431–438 are both providers and end users of audio, video, and information services. Analogous to a communications network, each participant is able to retrieve and transmit audio and information from any other participant. A radio-on-demand system, in general, and the delivery of radio-on-demand services, in particular, are herein intended to be deployable by a variety of possible networks and Multimedia Player configurations. FIG. 4 show a plurality of wired and non-wired transmission infrastructures that may be implemented, including one or a hybrid combination of fiber optic 401, coaxial cable 402, twisted copper wire 403, microwave, radio 404, and satellite 405 transmissions. Examples of radio-on-demand capable networks are the "video dialtone" model advanced by the Federal Communications Commission, and the internet.

Each participant in the network obtains a hardware configuration consistent with their desire and objectives, and their financial resources. The system of a participant who wishes to serve as a provider 411–413 is functionally equivalent to a capability rich Multimedia Player previously detailed with respect to FIG. 1, differing only in that the respective resources are appropriately scaled and modified to simultaneously access a variety of audio and information resources and commercially service a substantial number of end users. A provider may utilize one or more Multimedia Players 431 in delivering radio-on-demand services.

A radio-on-demand provider system 411, comprises, for example,: i) communications technologies 421 for establishing a plurality of communications streams to a plurality of Multimedia Players 431–438; ii) processing hardware and software 422 for retrieving from a Multimedia Player an end user's music, information, and technical preferences, and for automatically selecting, for each of the participating end users, audio and information that is responsive to the preferences; iii) mass storage random access memory devices 423 for storing one or more music and information databases ("audiobase"); and iv) processing hardware and software 424 for maintaining accounting and support services in connection with services provided.

Providers may be further categorized according to the functions served and/or the extent and character of the audiobase maintained. Central providers 411 may be capable of providing a greater variety of services than for example regional or local providers 413. Regional or local providers 413, however may be the source of local interest services such as are currently broadcast by local radio and TV stations. Other providers 412 may act as "libraries" for specialized categories of audio, as for example an historical archive of government proceedings; or electronic shopping services. The internet architecture and the different classes of web sites are suggestive of the wide range of configurations that are possible.

A user's access to the resources of a provider 411–413 need not be direct. A requested audio may be downloaded, in real time or non-real-time, to a services provider that may be more economically accessible to the intended user. Within the network, some providers may not directly provide any services to users, but act as centralized originators or depositories for other providers.

The particular configuration of a end user's Multimedia Player's random access, storage, memory, processing, and communication means and capabilities are responsive to, but are not necessarily limited by, the minimum requirements of, for example, a particular service provider. A Multimedia Player configuration, such as detailed with respect to FIG. 1, provides the required accessing and storage, processing, and communications architecture required by a network-based remote radio-on-demand provider.

As previously indicated, the Multimedia Player's multi-user and multi-services modules support separate controlled independent access by a plurality of users of the Multimedia Player's processing, and communications resources. In addition to speaker/display systems 451 that may be supported by a Multimedia Player 431, the multi-user module and multi-services module installed also provides services to a personal multimedia computer including a monitor and keyboard 452, security system 453, voice and/or video/voice telephones 454, and a remotely located subsystem 455. In this fashion a Multimedia Player acts as an intermediate provider.

As is shown in FIG. 4, the particular location of a Multimedia Player, subsystems, and/or components are not limited to any particular location, arrangement, and/or configuration. A variety of configurations are possible to meet the various needs an end user. The Multimedia Player detailed with respect to FIG. 2 permits a user to have available a significant number of functions and capabilities irrespective of the user's particular location at any moment in time.

For illustration purposes, some connections between Multimedia Players and output devices are shown in FIG. 4 with lines. However, communications may be established by any of a variety of wired or non-wired means. Thus, a Multimedia Player 431 need not be directly or indirectly connected by wire to other devices. Further, devices may be connected to one of a plurality of communications ports 441–443 which may be communications with a Multimedia Player 431. The communications port may be of varying degrees of intelligence and capabilities, it may serve to boost or manage the signal, or have no other purpose than to serve as a convenient outlet in which to plug and unplug devices.

In an embodiment shown in FIG. 4, a residence may be "wired" or "networked" with convenient ports in a manner analogous to an electrical wiring of a house. In this instance however, a Multimedia Player may be plugged into any of the ports, self configuring the port addresses so that the devices, that may be plugged into other ports, automatically identify themselves and establish communications with the Multimedia Player.

Additionally, Multimedia Player modules may themselves be physically distributed over the network. The plug and play of modules across a network architecture permits, for example, that a DVD module (101 FIG. 1) be physically remote from a Multimedia Player's 431 main unit and plugged on a port 442 near a television/speaker 451. In this instance, the case 455 housing the DVD module also houses a compact storage module (105 FIG. 1). Thus, a single DVD module can be easily moved from one location 442 to another location 441 when physical proximity is required to conveniently replace discs. It is noted that while the disc module case 455 is connected to a first port 442, it would be remotely accessible to a terminal 433 plugged into a second port 443.

It should be appreciated that the Multimedia Player's core components may be located anywhere inside or outside a residence. Specially, where a Multimedia Player includes fans and disk drives, the top of the TV set would not be an ideal location.

As suggested earlier, an object of FIG. 4 is to convey the concept that an end user's Multimedia Player 431–438 and an audio/video production system 471 and an information production system 472 can both upload and download audio 481 and information 482, captured by a wide variety of devices 491 (e.g., microphones, cameras, scanners, and keyboards), through the network directly to other end users 431–438, editing systems 452/471, and/or to the servers of providers 411–413.

As indicated previously, a Multimedia Player can accommodate a plurality compression and decompression technologies to both retrieve and decompress, and compress and transmit through the network. Preferably, a specific audio originating at a digital camera 491, downloaded to a non-linear editing system 471, transmitted over the network 400 to a server 411 for retransmission over the network 400 to a Multimedia Player 431 will utilize a single compression technology to avoid compounding the effects of artifacts that may be introduced by a particular compression technology. Clearly, where the decompression technology resides completely in software, the audio itself could include within and provide the required decompression software.

The capability to read/write the user preferences from and to an user access media provides a user the means to automatically configure a Multimedia Player that had not previously learned the user's preferences (dumb Multimedia Player). In anticipation of the desire to efficiently utilize a dumb Multimedia Player 432, a user instructs a smart Multimedia Player 431 to download to the user's user access media 144 the desired preferences and audio/information selection routines. To automatically configure the dumb Multimedia Player 432 and retrieve audio/information consistent with the user's preferences and selection criteria, the user provides the prepared user access media 144 to the dumb Multimedia Player 432, or to an accessory device housing a compact portable storage subsystem 105 and in communication with the dumb Multimedia Player 432. The user access media 144 automatically configures the dumb Multimedia Player 432 without necessarily downloading the user's preferences other than to volatile memory. This operation is similar to moving a game cartridge from a first game player to a second game player.

Transporting the user's preferences and selection criteria facilitates the process of automating the retrieval of radio-on-demand services from a provider 411 by the use of any Multimedia Player 431–438 that may be available to a user. In this fashion, for example, a traveling executive can automatically configure a Multimedia Player in a hotel room to play a radio-on-demand session comprising videophone messages, the day's news in a format and for topics preestablished by the executive, within a playing of music that is responsive to the executive's music preferences. The operation being analogous to inserting an access card in a hotel room door.

A similar automated configuration may be performed by means of the networks communications capabilities that may be available to both a dumb Multimedia Player 432 and to a smart Multimedia Player 431. This particular embodiment may or may not include the utilization of an user's access card.

A Multimedia Player 431–432 may also directly download, communicate, or otherwise transfer a user's preferences, selection criteria, audio, and/or a radio-on-demand session to another Multimedia Player 434/438, or a compact portable personal audio device similar to the RIO 500, the teachings, previously incorporated by reference, explain that it "stores up to two hours of digital-quality music and up to 32 hours of spoken audio programs", and that a user can "Access thousands of music and audio files at RioPort.com and over 16,000 hours of Audible.com audio programs. Instantly create, customize and mix your favorite music and audio selections on your PC or Mac for playback on your Rio."

In an vehicle implementation, a Multimedia Player in the vehicle 437 may be self contained and/or accommodate a removable module or device to which a user may download the user's preferences, selection criteria, audio, and/or a radio-on-demand session. Additionally and/or alternatively, the speaker system in the vehicle may be configured to accept the audio output from a portable Multimedia Player, such as the unit detailed with respect to FIG. 2, either by means of a cable or by direct insertion into a built-in docking bay.

Clearly, the field of vehicular audio systems is well developed. Since a vehicle is an ideal platform for radio-on-demand, it is a particular object to synergistically integrate the teachings herein with the elements, components systems, steps, and/or methods shown in vehicular audio systems. For example, the teachings of the previously incorporated '893 patent which shows and is titled "Music-Playing System For A Motor Vehicle" can be modified so that instead of musical pieces being radio communicated on-demand to the vehicle, a radio-on-demand session including interleaved musical pieces and information items is communicated to the vehicle. Additionally, and/or alternatively, the musical pieces in such a system may instead be informational items that are interleaved and sequenced with musical pieces retrieved from a music storage in the vehicle rather than a music storage outside the vehicle.

A user may select to, for example, purchase a plurality of DVD-Audios and store them within a Multimedia Player having the capacity to store and randomly access an entire collection of discs. Other users may prefer to save to a storage in a Multimedia Player only selected audio items, and delete and add individual items as a user's audio preferences change and/or new audio items are obtained. These are example of a physical audio library stored on a storage included within a Multimedia Player that is physically accessible by the user.

Additionally and/or alternatively, a user may prefer to build a virtual audio library or supplement with virtual audio items a physical audio library. An user need not have physical access to the various means that may store the audio items of the user's audio library. In a manner analogous to a book library that contains both physical items and references of other physical items located outside the library, for a musical item to be included in an audio library, all there need be in the audio library is a reference to where such musical item is stored. In other words, a musical item may be incorporated by reference in a library. Virtual audio items may be, for example, those items identified by a URL and retrievable on-demand from a remote web site. Virtual audio items may also be identified by a broadcast time and station or channel.

A virtual audio item may be retrieved at the time of its playing, i.e., retrieved and played in a real-time manner; or retrieved in advance of the time it is to be played, temporarily stored in any of a Multimedia Player' storage means, and erased from memory after being utilized for a single playing of for a plurality of scheduled or projected playings.

Virtual audio items in a user's audio library do not contain the data that actually produces the audible content, rather

they contain information, e.g., pointers, to where that data is located. A completely virtual audio library is therefore a database of information relating to audio items. While a physical audio library may not require a database associated with it, there are significant advantages to supplementing in a database the information that may be provided with an audio item. For example, a database facilitates keyword searching and other capabilities available with, for example, the use of SQL. For this purpose a dedicated database package may be implemented, or a broadly available package may be configured, e.g., provided with a schema, query forms, and reports, to serve the requirements of most users. The database may also serve the objects of establishing and maintaining a user's preferences.

Accordingly, where advantageous, an audio library indirectly or directly comprises an audio library database having information for at least some of, each of, other than, and/or more than, the physical and/or virtual audio items in the audio library.

A user's audio library and/or a user's audio library database may also be part of, and be commingled with, a larger audio library and/or database. For example, a household may maintain a single CD library to which each member of the household contributes to and utilizes according to their specific music preferences. A single relational database can serve to maintain the appropriate records.

A user's music preferences, e.g., preferences for audio which is musical in character, may be defined by all of the audio items that a user includes in an audio library. Additionally and/or alternatively, a user's music preferences may be defined by a subset of all of the audio items that a user includes in an audio library. A user's music preferences may be defined broadly with respect to, for example, musical categories (e.g., classical, rock) and/or personal categories, (e.g., mood, tempo, and occasion) and performer classes and/or individuals; and/or specifically with respect to individual audio items. Music preferences may utilize Boolean expressions, e.g., songs from a user's preferred list of individual performers satisfying a user's musical category preferences and personal category preferences. Music preferences may be established by means and methods similar or analogous to the means and methods of the previously incorporated teachings of the MUSICMATCH JUKEBOX and the REALJUKEBOX audio players.

Additionally and/or alternatively, a user's music preferences may be specifically defined by, for example, a user's directly prepared and ordered playlist of audio units selected by the user from the user's audio library. Additionally and/or alternatively, playlist functions such as the MUSICMATCH's "AUTODJ" are utilized to create automatic playlists. Among other capabilities, MUSICMATCH's "AUTODJ" function permits a user to enter the length of time for which the user would like the playlist to play, and to select the criteria that the creation of the playlist will be responsive to. Music preferences may also be established by an automated purely random playing of musical items from the user's audio library.

Manual or automated playlist functions may also be responsive to a user's audio library, music preferences, playlist, and/or to rules for playlist creation patterned after the rules that, for example, a professional disc jockey implements in playing selections for a live audience. Preferably, musical items to be included in a playlist are paired and organized to provide an elegant fluidity and transition between items. For example, three slow tunes are followed by a more moderately paced tune, and by two fast paced tunes.

Playlist functions may also be responsive to the time of day, season, particular public or private dates, sign on/off audio items, and information introductions and follow-ups. An example, of the latter is for example, where a report about a particularly good increase in the value of the user's stock portfolio would be followed by a few "we're in the money" bars.

The establishment of a user's music preferences may be constrained by the availability of songs in a personal audio library and/or the songs in a target public or commercial audio library. That is, if the library does not contain classical music, and if the preferencing process is freeform, as for example, by the entry of keywords or by a natural language query, the user is provided an appropriate message during the preferencing process. On the other hand, when the object of the establishment of a user's music preferences includes adding audio items to the user's audio library, and/or the user has access to audio items other than those in a personal audio library, the preferencing need not be constrained.

A user's music preferences may be communicated to a remote library for purposes of downloading, for the user, audio items. Such a method takes advantage of any one or combination of more than one of the previously detailed networks to which the user's particularly configured Multimedia Player may have access to. For example, as in the MusicMatch method, a user may utilize the web to directly access a website to download a user selected audio item. Additionally and/or alternatively, the teachings of, for example, the previously incorporated U.S. Pat. Nos. '675, '051, '575, and '246 may be advantageously adopted to meet particular objectives.

By contrast to a direct audio acquisition method, a Multimedia Player can be configured to automatically acquire audio items. For example, a satellite, cable system, or other broadcast may, advantageously, transmit overnight thousand of audio items, in a compresses non-real-time manner, from which a Multimedia Player could selectively download musical items. In this situation, the Multimedia Player's software may be dependent on obtaining direct information that serves to identify the broadcast time of the various offerings. Providing a broadcast schedule and audio database to which the preestablished user's music preferences could be applied to identify audio items for downloading could be done substantially in advance of a programming cycle, e.g. 1:00 AM each day, or more or less contemporaneously, e.g., in advance of each song transmitted.

Additionally and/or alternatively, the Multimedia Player's music acquisition functions temporarily stores a musical selection for purposes of "listening", i.e., analyze the songs musical characteristics, and determine its potential suitability. For example, if the user's library contains a number of Louis Armstrong selections, music acquisition software "learns" or identifies the particular characteristics present and utilizes them to detect the signature voice as well as the prominence of the trumpet and accompanying instruments in other selections. The music acquisition functions can listen for the presence and/or the absence of musical characteristics. This is particularly advantageous when a user's music preferences require new, contemporary, and/or avant-garde selections. The recursive feature of the music acquisition function allows it to learn from its recommendation "mistakes", identified by, for example, a user terminating the playing of a selection. For these purpose, the user's audio library database maintains a record of the recommendation source (e.g., system, person, service), methodology, and/or criteria utilized. The object is to provide a fully intelligent autoactive audio acquisition system.

The various audio acquisition methods and systems directly detailed herein may also be synergistically integrated with, supplemented by, or replaced by, any of the methods and systems of the U.S. patents previously incorporated by reference.

As previously indicated, information preferences refers, principally, although not exclusively, to preferences for audio which is informational in character, such as the audio that is produced by an AM radio broadcast between the playing of songs. Information preferences refers to, for example, preferences for information relating to the song being played, and/or news, weather, and traffic reports, jokes, quotes, inspirational or motivational messages, advertisements, and/or programming of a non-musical nature.

A user establishes information preferences with respect to, for example, news of interest, in at least one of a plurality of major categories (e.g., stocks, weather, and traffic) and sub categories, and/or specific items. For example, responsive to a user's specific information preferences, stock quotes for the overall indexes and each of the stocks in a user's stock portfolio, may be delivered at specified intervals, at specific period of times, at significant movements, e.g., price, volume, and/or with news stories, reports, filings, and interviews.

Information preferences may be established off-line, and/or online directly with an information provider or with an intermediary. The internet provides extensive models for the establishment of information preferences including, for example, http://www.yahoo.com, http://www.altavista.com, http://auto.search.msn.com, and http://www.nasdaq.com, the teachings of which, as of Oct. 18, 1999, are incorporated by reference herein.

Preferably, although not necessarily, radio-on-demand utilizes at least one dedicated information provider whose information services are specifically designed to be supportive of radio-on-demand information requirements. With such a provider, a user may also be able to pre-establish information and scheduling preferences to enable the provider to search out and/or prepare informational items required by the user in advance of the user actual request for the information. Further, such a provider may also maintain a database recording what informational items a user has actually been provided and/or listened to, to avoid duplicating information provided, and to enhance the user's preferences profile. Still further, by analyzing the requirements of a plurality of users, a provider may desire to allocate information gathering resources to more closely match the interests of the users.

Additionally and/or alternatively, radio-on-demand may also utilize one or more generalized information providers, such as YAHOO! or a radio based information provider, whose information services may be synergistically and transparently integrated to support radio-on-demand information requirements.

Preferences can also be established to exclude content from being selected, retrieved, or made audible. Music preferences and information preferences may also be established with respect to, for example, content categories of possibly suitable or unsuitable content, descriptors, codes, ratings, flags, and/or keywords. The existing art, including the '678 and '918 patents previously incorporated by reference, offers a variety of coding schemes that may be implemented alone or in combination to meet particular objectives.

Accordingly, such music and information preferences require that audio units and information be, for example, categorized, described, coded, rated, flagged, keyworded and/or analyzable to permit retrievals that are responsive to a great variety of user preferences. Additionally, audio units may be mapped and the various audio units may be specifically categorized, described, coded, rated, flagged, and/or keyworded. While mapping audio content that is of 2–4 minute duration, e.g. a song, may not be generally as useful as the mapping of a full length motion picture, there are nonetheless instances where such mapping is advantageous. For example, identifying the audio unit most representative of a song can serve to quickly organize and pre-listen to a playlist, specially when the "listening" is to be carried out by a software agent.

As previously indicated, technical preferences comprise, for example, a preference for the relative volume and speed of the different categories of information, and the voice to be utilized in the synthesizing of information. For example, a voice imitating the president's voice may be utilized to deliver the weather information, while the voice of the user's mother may be utilized to deliver traffic reports. A user may prefer that advertisements be delivered at a 20% lower volume than the volume selected for musical content, and at a 10% faster rate that a real-time rate.

In general, preferences may be established individually, in combinations, and/or as specified by logical Boolean operators (e.g. AND, OR, NOT, AND, NEAR) and may be applied across the different categories and classes of music, information, schedule, and technical preferences. For example, certain technical preferences may be applied in the playing of music, and a different set of technical preferences may be applied in playing of stock quotes.

Once information preferences have been established, radio-on-demand need not require anything more of a user than turning on the service, e.g., running the software program. Radio-on-demand is designed to automatically produce a continuous playing of audio responsive to the preestablished music and information preferences without a need for the user to intervene.

However, radio-on-demand also supports a high level of interactivity which may be utilized to, for example,: i) skip past an audio, e.g., a song, show, or information audio unit (e.g. Skip Forward); ii) replay an audio or segment of an audio (e.g., What?); iii) obtain additional details and supplementary information on an audio (e.g. More!); and/or iv) request information.

As was illustrated with respect to FIG. 2, a key 212 may be activated by a user to cause the Multimedia player to obtain and provide an updating of information, e.g., current stock quotations. To the extent that an information request may require some time to fulfill, sequencing functions provide a message acknowledging the request, a time that such request may be fulfilled, and continue with the previously scheduled radio-on-demand session until the requested information can be made audible.

Interactivity also permits radio-on-demand functions to refine the user's music and information preferences. For example, if a user's causes a premature termination of the playing of a song, the playlist is updated accordingly, either eliminating the song from the playlist, or assigning to it a lower preference or incidence rating. The up arrow and down arrow keys of screen position and control key set 251 enable the user to express a like or dislike for an item.

Generally, the design of a user's music and information preferences eliciting routines and user interfaces are responsive to the particular descriptive structure that was implemented in analyzing the content of the audio and the information.

FIGS. 5 and 6 illustrate an example of an information preferencing screen 501/601. In this particular embodiment, the information preferencing routines have established which user 511 of a plurality of users has gained access to the system and have caused a display of a message relating to the access permissions 512 for the user 511. In this example, user 511 has unrestricted access to the information preferences routines.

Each screen displays up to three sets 521–522/622–624 of linked scrolling buttons each individually selectable by means of a pointing device, e.g., a mouse and associated graphics 513. In the illustrated example, a user is interested in being kept updated with respect to information relating to the next game that the University of Miami college football team will play. One method of establishing the information preference is to cascade through the options 521, 522, 623, 624 which are displayed responsive to the user selection. Alternatively, the user could utilize the keyword search capability 531. Still alternatively, the user could utilize a combination 532 of the predefined categories 521–522 and a keyword search 531.

Clearly, a great many preferencing GUIs may be implemented. For example, preferencing screens may be patterned after the books and pages of the MUSICMATCH help system previously incorporated by reference. Further, a preferencing means need not be based on the utilization of a GUI and/or a pointing device. A preferencing means that is entirely operated by a speech recognition and voice response system is particularly advantageous in, for example, a portable radio-on-demand apparatus and an vehicle implementation.

Once established, a user's preferences may be stored in a nonvolatile resident memory, in the memory of the fixed or removable storage subsystem, a user's optical read/write access card or electronic memory card, or from a read/write video/data disc. Storing a user's music and information preferences in a portable means facilitates autoconfiguring a radio-on-demand capable apparatus.

A method of playing radio-on-demand is principally detailed with respect to the flow chart of FIG. 7. Upon selection of the play function or turning on the apparatus, as in, for example, a dedicated apparatus, software, firmware, and/or hardware processing capabilities begin a radio-on-demand session 701 with the object of instantaneously playing an audio 702 in response to a reception of a start/play command 701. The selection of, for example, an audio unit 702 from the user's audio library can be arbitrary, random, or in response to a preestablished preference, procedure, or by utilizing a previously identified audio item.

The playing of a first audio item 702 can serve as background audio to, or be an integral element of, for example, the user access control routines which begin by issuing a command to read the user control setup to ascertain if user control is enabled 711. If enabled, the handshaking routines request user identification and, if required, a corresponding password 712. If the user identification and password are not found acceptable 713, the appropriate error message is provided 714, and the apparatus is returned to a state prior to the user play request 701. A first audio item 702 can comprise an audio requesting voice identification 712.

If user identification and password are found acceptable 713, other restrictions 715 to a user access are checked. These additional restrictions include, for example, time of day restrictions and/or accumulated usage during specified time frames. If restrictions are enabled that prevent usage 715, an appropriate error message 716 is provided, and the apparatus is returned to a state prior to the user play request 701.

The user-permission capability enables a parent to have complete control over the use of the apparatus, and provides for multiple individualized preferences. U.S. patent '661, previously incorporated by reference, details "a device and method for controlling television usage by children and other users", which can be similarly implemented.

As is shown in FIG. 7, time and other restrictions 715 may operate independently of user control functions 711 in, for example, those instances where restrictions in the operation of the apparatus do not differentiate between users.

If user control is not enabled 711, or if enabled and verification of the user 713 and verification of other restrictions permit usage 715, the radio-on-demand initialization routines continue with, in this example, the scheduling preferencing routines 721.

If it is determined that schedule preferences have been preestablished 721 and they are not to be modified, or are not required, then initialization proceeds with the music preferencing routines 731. If the schedule preferences have not been preestablished and are required, or they are to be modified 721, then initialization proceeds with enabling the routines required to establish schedule preferences 722.

Whether preestablished or contemporaneously established with a particular session, the schedule preferences can be as simple as, for example, enabling a user to specify the duration of the radio-on-demand session. Schedule preferences can also be as detailed as, for example, specifying a time at which specified types, classes, or items of information (e.g., stock market reports) are provided, and the relative mix of specified types, classes, or items of music and information. Schedule preferences may also be responsive to a personal or publicly significant time of day, day of the week, month, year, special occasions, and/or to the schedules, reminders, entries, or other information in a user's contact manager database.

If it is determined that music preferences have been preestablished 731 and they are not to be modified, then initialization proceeds with a playing of audio that is responsive to the music preferences 733. If the music preferences have not been preestablished 731, or they are to be modified, then initialization proceeds with enabling the routines required to establish music preferences 732, followed by a playing of audio that is responsive to the music preferences 733.

If it is determined that information preferences have been preestablished 741 and they are not to be modified, then initialization proceeds with the routines required to obtain information 751. If the information preferences have not been preestablished 741, or they are to be modified, then initialization proceeds with enabling the routines required to establish information preferences 742.

If the transmission of the information can be responsive to the information preferences, i.e., on-demand 751, then the information preferences and/or the required information are communicated to the information provider 752, and the information that is selected in response to the information preferences and/or the required information is received 753. Otherwise, for example, broadcasted information is received 754, to which the information preferences may be applied to select only the appropriate information 755. A radio-on-demand session need do nothing more than substitute a user's preferred musical items for the broadcasted musical items, buffering for a sequenced replay some or all of the informational items being broadcasted.

Radio-on-demand is advantageously and significantly distinguished by the step of interleaving and sequencing of

audio and information **761** to seamlessly and audibly play **762** information within a playing of musical items that are responsive to a user's music preferences.

Generally, herein, interleaving and/or alternating means to arrange a playing of an information item to be in-between a playing of two musical items. For example, a radio-on-demand session responsive to a user's music, information, technical, and schedule preferences, interleaves audio and information by beginning with musical items **1** and **2** from a user's CD, and following with synthesized stocks reports from data transmitted by a radio-based service, musical item **3**, **4**, and **5** from a web site, synthesized news relating to DVD-hardware from YAHOO! news service, a reminder from a contact manager to prepare for a meeting, and the local weather extracted from a television scheduled broadcast, and ending with a ten minute audio segment from a scheduled broadcasted radio program.

Generally, herein, sequencing, synchronizing, coordinating, and/or harmonizing a playing of two audio items means that the end of an audio item is arranged to be followed by a beginning of a next audio item without a significant delay. Examples of a sequencing of two audio items are the arrangement of music performed by a disc jockey at a party and the arrangement of programming conducted by radio station producer. The MUSICMATCH audio player program, for example, automatically sequences a playing of a plurality of songs responsive to a playlist. As is shown by the examples, to seamlessly play sequenced audio and information **761** may require the advance retrieval and temporarily buffering of items until required to be inserted at the appropriate time. Any of the memory and/or storage means available in a Multimedia Player could be utilized for a temporary buffering.

Where advantageous, a sequencing prematurely ends or interrupts a playing of an audio item to play another audio item. For example, information deemed to be of high priority by a user may interrupt "scheduled" programming, and for example, be looped until the user acknowledges reception of the communication. Where the radio-on-demand functions are synergistically sequenced with communications such as voice, fax, and email, a playing of, for example, a musical item may be interrupted by a telephone call but not by a recorded phone message. Responsive to a user preference, a recorded message would be sequenced to be played at the conclusion of the musical item and before the next previously scheduled audio item.

On exception, an interleaving and sequencing also means combining musical content and informational content to produce, in real-time, a multi-layered audio. A musical item may be advantageously and intentionally played at a lower than normal volume to provide a background to a simultaneous playing of an informational item. For example, an inspirational or motivational sentence may be played within a playing of an instrumental recording. For these purposes, tracks may be selectively utilized from a multi-track audio, i.e., the vocal track(s) may be dropped or its volume lowered while the instrumental track are utilized as a background for an informational item. Multi-layering of audio may be responsive to user and/or system preferences. Alternatively, the producer of the item may include with the item producer preferences that are applied during the playing of the item.

As is illustrated, the steps of obtaining information **751–755**, and/or alternating and coordinated musical and informational items **761**, may be repeated any number of times **765**, and while maintaining a seamless playing of musical and informational items **762**.

The playing of radio-on-demand may be ended by a user direct termination **763** (e.g., turning off or disconnecting the playing), or by a preestablished termination time or event **764** (e.g., specified time of day, length or duration of playing, when a specified audio item is played, responsive to any scheduling preference, or schedule).

A Multimedia Player capable of playing radio-on-demand comprises, for example, a modem for communicating a user's previously established information preferences to an internet-based information provider, and for receiving information that is responsive to the user's information preferences; a processor for interleaving and sequencing, for the user, a playing of the received information with a playing of a plurality of musical items included in an audio library of the user; and such electronic components and random access storage as may be required for a playing, for the user, the received information interleaved within, and sequenced with, a playing of the plurality of musical items.

In a Multimedia Player without built-in means for directly making the information and musical items audible, the term "playing" is to be understood as meaning, for example, providing what may be required for an external speaker(s), head set, and/or other Multimedia Player to make the information and musical items audible to a user.

In the method detailed with respect to FIG. **7** many steps may be omitted, modified, supplemented, and/or rearranged and additional steps may be incorporated to suit particular objectives and implementations. FIG. **8**, illustrates an example of an alternative embodiment which may be included as one option of a range of user selectable methodologies, or be the only methodology utilized by a particular device.

In this particular embodiment, upon selection of the play function or turning on the apparatus, software, firmware, and/or hardware processing capabilities begin a radio-on-demand session **701** by playing audio **702** from the use's audio library. Contemporaneously, the information preferences are communicated to an information provider **752**. Next, information is received **753** that is responsive to the information preferences.

Contemporaneously with the communicating of the information preferences, radio-on-demand functions automatically generate a random playlist of the musical items present in the user's audio library **732**, and may begin in advance of receiving information with a playing of musical items according to the playlist. Upon reception of information, the interleaving and sequencing **761** of the playing of the selected musical items and the received information is followed by seamlessly and audibly playing **762** of the received information within a playing of the musical items that are physically included in the user's audio library.

By contrast to the previous example, in this case, a radio-on-demand session may begin with musical items **1** and **2** retrieved from the hard disk of the user's Multimedia Player, and be seamlessly followed by synthesized stocks reports from data obtained from a web-based information provider, musical item **3** from a CD inserted in the user's Multimedia Player, and synthesized news relating to DVD-hardware obtained from YAHOO! news service.

An advantageously significant element of the inventions herein is the synergistic integration of a playing of content that is in an audible format (e.g. songs from a CD) with content that is not in an audible format and which is made playable by a voice synthesizing (e.g., information that is received, retrieved, downloaded, or otherwise obtained in the form of digital data representing ASCII characters). U.S.

patents '125, '886, and '797, previously incorporated by reference, as well as the references cited therein, show a variety of methods and means for synthesizing information. Radio-on-demand provides a significant service to the visually handicapped as well as to individuals that desire to multitask.

The method detailed with respect to FIG. **8** is to this point more streamlined than the embodiment detailed with respect to FIG. **7**. However, by contrast to the embodiment detailed with respect to FIG. **7**, the method of FIG. **8** also adds the steps of crediting or debiting the listening of audio, e.g., information, provided to the user.

If an audio is associated with a credit **840**, as may be case with a listening of an information item such as an advertisement, a listening verification routine **850** may be enabled. Otherwise the listening of the audio is presumed and the listening of the audio is credited **860**.

If a user verification routine is enabled **850**, at a point in the playing of the audio, a request **852** is made of the user requiring that the user respond by any one of the user access means that may be implemented in the user's apparatus. The request may be as simple as an audible request to press the play button in a remote control unit. A variety of other active and passive means may be implemented that establish a user's presence during the listening of the advertisement **853**.

Once the listening of the advertisement is verified **853**, the listening of the audio is credited to the user's account **860** in due course. If during a specified time the user fails to respond to the listening verification **853**, the user's account is not credited with the listening of the audio **861**. Further playing may be continued or discontinued **862**.

If a first audio listening verification fails **853**, listening verification may be repeated. As illustrated, a simple counting routine **851/855/856** is set up, for example, to repeat at least once, the user response request **852**.

Audio listening verification may require a plurality of user response requests **852** prior to crediting the listening of the audio **860**. In instances, where additional verification is required **857**, user verification is repeated.

The playing of an audio need not have been interrupted during the listening verification. It should also be noted that listening verification can occur during the playing of an audio item, and/or at the conclusion of the playing of the audio item.

If an audio is associated with a debit **841**, the playing of the audio is debited from the user's account **842**. The debiting of the listening of the audio may incorporate the audio listening verification routine above detailed with respect to the crediting of a listening of an audio. That is, the debiting of an audio to a user account is responsive to an appropriate user response to a verification request. As in the credit situation, if the listening verification fails, further playing of the audio may be terminated. In both a credit situation and a debit situation, if playing of the audio is terminated, where advantageous, e.g., a lengthy presentation, a record is retained of the point of termination, so that the audio, upon user request, may be continued from the point of termination.

In instances where the listening of the audio results in the user executing a purchase **870**, purchase information is captured and processed **871**. If a deposit is associated with the purchase **872**, the deposit is escrowed **873**.

Where a purchase occurs prior to an audio listening verification, the purchase constitutes effective listening verification, and therefore, further user verification may be omitted.

At an appropriate point in the session, the user is provided with an accounting **880** of the crediting or non-crediting of the listening of the audio.

Thus while the method detailed with respect to FIG. **8** is simpler, in terms of the preferencing, than the method detailed with respect to FIG. **7**, it incorporates additional steps that advantageously advance the subsidizing of the radio-on-demand services. It is also noted that FIG. **8** is one example of how the teachings of, in this case, the '918 patent, previously incorporated by reference, are synergistically implemented within a radio-on-demand embodiment.

The method detailed with respect to FIG. **7** can also be supplemented by the steps of recording: i) the radio-on-demand session as it is being played; ii) a transcript of the radio-on-demand session; iii) the schedule of the radio-on-demand session; iv) such minimal information, linkages, and pointers as may be required to duplicate a playing of the radio-on-demand session; and/or v) supplementary information and linkages to additional information relating to items in the radio-on-demand session.

Where advantageous, the recording is provided in a format or may be converted to a format to permit editing with a word processor. For example, a schedule and transcript of a radio-on-demand session includes a time an item is played, a transcript of each informational item, an identification of a musical item, and such passive and active supplementary linkages and pointers as may be potentially useful to a user. A user by means of a word processor could rearrange the relative position of individual items, delete items, add items, edit items by, for example, the same steps as in the utilization of a word processor. The user could then utilize the rescheduled and edited transcript to play a new version of the originally played radio-on-demand session. These capabilities are particularly advantageous in preparing, for example, a presentation, lecture, or lesson, including multimedia items which may be available for download and use by students.

It is emphasized that in a preferred embodiment, following the initial setup of a Multimedia Player with a user's information preferences, a radio-on-demand session need not require anything more than what is required to, for example, play a preset FM radio, i.e., turn the radio on. It is intended that generally, after the pressing of the play key, the Multimedia Player automatically initiates playing radio-on-demand without the necessity of any further user interaction or instructions. In those implementations that utilize interactive and recursive features, a user's apparatus can transparently fine tune its capacity to deliver to the user what the user desires.

It is also emphasized that the process of receiving information and interleaving and sequencing of audio and information is preferably repeated throughout a radio-on-demand session as per the information preferences and/or the schedule preferences. Clearly, since information is of most value when it is most current, to the degree that it is advantageous, the information is obtained and played in a substantially real-time basis.

It is also emphasized that the number of items in a user's audio library need not be extensive. A longer radio-on-demand session can be accommodated by, for example, playing musical items more than once by, for example, looping the playlist, creating new playlists, continually randomly selecting musical units, or combinations of these.

An audio library database may maintain a log of when the items have been acquired and played to, for example, avoid overplaying a limited selection of audio items, and/or to play

audio items the required number of instances. Frequency patterns can be established for the playing of audio items, e.g., as the number of days from the acquisition day increases the number of times a song is played is exponentially decreased.

A multiple playing tracking may be set in such a manner as to ensure that all of the audio units that may be played are played within a user selected number of sessions. For example, a user may determine, based on a first listening, that the user is likely to desire to listen to a musical item a total of ten times over the next three four-hour radio-on-demand sessions. Accordingly, the tracking software would cause the musical item to be played six times the first session, three times the second, and one time the third session.

Still alternatively, or additionally, the tracking software may itself code the various audio items for the number of projected playings based on, for example, similarities to other musical selections. Still alternatively, or additionally, audio units may be coded with or associated with a random function to enable playing responsive to, for example, a number/bit code, assigned to a audio unit, that is compared for a match with a software extracted or randomly generated number/bit. The randomness of the playing of multi-play audio units may be established with respect to any number of different probabilities.

Additionally, different probabilities may be established for different playings. For example, a playing of a audio unit may be responsive to a 100% probability in a first playing, a 66% probability in a second playing, and 10% probability in any playing after the second playing. Further, different random settings can be set for, for example, each user in a household. Still further, a multiple playing of an audio unit may be dependent on a playing of other audio units.

A Multimedia Player's capability to obtain audio and information from a remote provider permits a user to efficiently obtain audio units and/or information from a remote library or a plurality of libraries, to be played at the time of the user's choosing. Similarly, a playlist need not comprise or result from a single audio library. A playlist may result from the automated selection of a variety of audio units from one or a plurality of audio libraries.

To obtain audio and information, a user may establish preference of considerable detail, including, for example, a variety of keywords to describe the subject matter and content. Further, audio and information may be obtained by, for example,: i) specifying a title or code obtained from a reference guide; ii) making a selection from a listing in alphabetical order by title, subject matter, categories, etc.; iii) tree structure of classifications, for example advertisements, automobiles, 4WD; iv) keyword searching and retrieval (similar to the AUTOMATED PATENT SEARCH patent retrieval implementation); and v) any combination of these. It is noted that a reference guide may be available in a printed format or, preferable, a real-time format compatible with a Multimedia Player, e.g. retrieved from a Web site.

In the event that a match between a user's content requirements is not exactly satisfied by the available audio and/or information, the search software may, at the user's option or by default, reduce or eliminate content criteria to provide a listing or selection that approximates as close as possible the user's requirements. A listing of available audios could be in a form similar to that provided by an ALTAVISTA web search engine with links to home pages and/or links that would play, for example, an excerpt.

An audio library database may also store data and information obtained during a radio-on-demand session, including linkages to web sites/pages, to enable a user to obtain the information played and/or additional information. In this fashion, a playing of a plurality of radio-on-demand sessions can produce a database with significant amounts of personalized and highly relevant data and information.

Separate routines are implemented to supplement and maintain the information without requiring the user to conduct a radio-on-demand session. In other words, for example, in the absence of a user, a Multimedia Players software can conduct virtual radio-on-demand sessions to, for example, "listen" to new selection and, in due course, offer recommendations, and/or collect and update information in the database.

Where audio items are retrieved from a remote source, utilization of the audio units included in a playlist need not await the completion of the downloading of all of the items. The user can begin playing audio in real-time while the audio and information in the playlist are being downloaded in real-time or non-real-time (burst downloading). Further, the downloading need not be accomplished in one session. Short burst downloading will provide a portion of the content. As that portion is utilized control software will re-link the Multimedia Player with the provider, request and receive a next portion, and disconnect the active linkage. During this operation, automatic and transparent to the user, a constant playing is maintained.

Short burst downloading is also, for example, advantageous where a provider's resources are challenged by a plurality of end users. By utilizing short burst downloading and overlaps, a single stream is able to serve a plurality of end users simultaneously. The control logic of this architecture is analogous to that utilized by single waiter serving a plurality of parties (tables) in a restaurant.

Alternative to a Multimedia Player initiating the re-linkage with a provider, the control logic of the video server periodically checks on the progress of the end users, downloading and scheduling subsequent transmissions responsive to each end users needs and the overall demand on the available resources.

In an on-line architecture, whether broadcast or pointcast, a Multimedia Player comprising principally communications capabilities without significant local storage, processing, or memory, is adequate. In such an architecture, a user's preferences, if not stored in the Multimedia Player, may be retained by the video provider. An on-line architecture is advantageous in a compact portable Multimedia Player implementation. A portable radio-on-demand player can also be used to pre-load a complete radio-on-demand session to be played at a subsequent time by a user. Such a preloaded session skips the storage of audio, programming, or information which if not updated is of no value to the user, e.g. stock quotes prior to the markets closing or specified time.

FIG. 9 is a flow chart further detailing the steps of retrieving audio/info from a provider. It is noted that handshaking and other routines are flexible and user configurable and a number of permutations and variations of what is detailed are possible.

Upon receipt of an user command **901**, a Multimedia Player provides power to the required units and subsystems to be able to produce audible content, and transmits an appropriate acknowledgment **902**.

Access routines previously detailed with respect to FIG. 7 steps **711–716** are summarized in FIG. 9 as steps **903–904**.

In an embodiment, although not necessarily, these routines reside within a Multimedia Player and are executed prior to, or after, establishing a communications linkage with either a network administrator or directly with a provider.

As previously detailed, if access is denied **903**, an error message **904** is provided and the Multimedia Player is returned to the state prior to the user activation request **901**. Delay routines may be implemented to provide the user the opportunity to attempt to obtain access without a Multimedia Player going to "sleep".

If access is permitted **903**, retrieval routines are enabled **905** to permit the remote retrieval of audio and/or information. In a multi-stage retrieval situation **910**, e.g., when the user first establishes communications with the network administrator **911**, e.g., an ISP, a cable, and/or telephone company, a particular provider **912** is first selected, and then the desired content is requested **920**. Alternatively, retrieval routines **914** permit a direct selection of a provider **912**. Content selection **920** then proceeds on-line with the selected provider. A provider can be preestablished as in the selection of a long distance communications carrier. In that case, the user would skip having to select a provider immediately prior to an audio/info request. Further, a user may establish relationships with specific providers for specified services.

Still further, an off-line content selection process **921** itself may determine with which provider a communications linkage is automatically established **922**. The result of the content selection process is automatically communicated **923** to the appropriate provider upon the establishment of a communications linkage. Clearly, the selection of a provider is not required in those instances where a user obtains all the services from a single provider, web site, or source.

It is noted that other combinations are possible and that retrieval routines may reside within a Multimedia Player to further minimize the on-line time, or be provided on-line at different points in the communications than shown here. The content selection process may implement any one or more routines that are suggested by the examples herein provided and incorporated.

Once audio/info content is selected, if the user remains on-line during a playing of a radio-on-demand session **930**, the appropriate user preferences are communicated to the provider **931**. The provider then applies the user's preferences, interleaves and sequences the audio and information, and produces a seamless transmission of sequenced and interleaved audio and information that is responsive to the user's preferences and which is played **932**. In this case the user remains on-line during the listening of the radio-on-demand session **932**, but has access to control functions as if the content was retrieved from a Multimedia Player's storage devices.

Alternatively, when the audio and/or information that may be required is downloaded from the provider **941**. Utilization of the downloaded data is then the same as previously detailed with respect to FIG. **7**. In this case the interleaving and sequencing of the audio and information responsive to the user's preferences **942** is performed by the Multimedia Player, which then audibly plays the information within a playing of, for example, the musical and program items **943**.

It is again emphasized that whether detailed with respect to FIGS. **7**, **8**, and/or **9**, audio and information items for a radio-on-demand session may be retrieved from: i) a single local source; ii) a single remote source; iii) a combination of a local source and a remote source; and/or iv) any combination of one or a plurality of local sources and one or a plurality of remote sources.

As previously detailed, in a preferred embodiment a Multimedia Player is capable of simultaneously receiving, managing, and seamlessly integrating a plurality of audio, video, data, voice/video digital and/or analog communications and transmission. For example, while a Multimedia Player is playing a radio-on-demand session, the Multimedia Player may receive a communication. The communication may be in the form of a phone call, videophone call, fax, messaging and paging, and any analog or digital transmission. Thus, a user may prefer to, for example, interrupt a radio-on-demand session for phone calls on the business line and emails to the business email address, but not for personal communications.

A radio-on-demand and communication system for integrating the playing of a radio-on-demand session with the reception of a communication unrelated to the session comprises for example: i) means for playing a radio-on-demand session; ii) communicating means for receiving a communication unrelated to the radio-on-demand session; iii) accepting means for selectively accepting the communication; iv) terminating means for terminating the communication; v) pausing means, responsive the accepting means, for automatically pausing the playing of the radio-on-demand session; vi) resuming means, responsive to the terminating means, for resuming the radio-on-demand session; vii) updating means for updating the radio-on-demand session's scheduled information; and viii) rescheduling means for rescheduling the radio-on-demand session.

Referring to FIG. **10**, a user is likely to have identified himself or herself to a Multimedia Player as was previously detailed with respect to FIG. **7**. Similarly, the user of a computer-type application may have logged in, and thereby also provided a Multimedia Player with his/her identity. Thus, during a Multimedia Player's playing of a radio-on-demand session **1001** as, for example, previously detailed with respect to FIGS. **7**, **8**, and **9**, if the Multimedia Player receives a communication **1002** and if the communication identifies the specific intended recipient **1003**, a Multimedia Player's software routines are able to automatically direct the communication to an appropriate device **1004**.

Alternatively, depending on the nature of the communication, a Multimedia Player may provide the originator of the communication the means to direct the routing of the communication. For example, in a voice call, voice response software will provide the caller an appropriate voiced menu to provide the routing information. Other means active or passive may be available for a Multimedia Player to determine the proper routing **1005**. For example matching "Caller ID" with a table matching callers with recipients.

If proper routing of the communication cannot be determined by a Multimedia Player, the communication is directed to a default device consistent with the character of the communication **1006**. For example, in the case of a fax to fax machine or a Multimedia Player's fax software.

In this example, during a playing of a radio-on-demand session **1001**, a videophone communication **1002** is received, at which point an appropriate video and/or audio signal **1010** to an appropriately routed audio/video means is provided. The signal may include caller identification and other data relevant to or associated with the call.

If the user accepts the call **1011**, the Multimedia Player initiates routines **1021–1023** to cause playing of the radio-on-demand session to be paused **1024**. User acceptance of the communication may include, for example, picking up a receiver, pressing a key on a remote control device, a voice

command, or directly touching an icon on a screen either in a remote control device or on the display itself. Thus, a single user action or command **1011** both accepts the call and pauses the radio-on-demand session **1024**. Optionally, a user may configure the communication accepting routines to automatically accept communications.

Where the radio-on-demand session is being retrieved from a provider **1021**, the Multimedia Player transmits to the provider the appropriate pause commands **1022** causing the provider to pause the transmission of the radio-on-demand session **1023**.

If the user does not accept the call during a predefined time or the communication is automatically rejected, the Multimedia Player terminates the audio/video signal, if one was provided, and engages a communications recording function or device to receive a message **1012**. At the end of the message, the Multimedia Player hang-up on the communication **1013**.

An automatic integration of the playing of a radio-on-demand session and the acceptance of a communication may be variously configured by the user. The user may configure the Multimedia Player to cause a display of information relating to the incoming communication (data and image) on a display window, without necessarily pausing the transmission of the radio-on-demand session.

The flow chart of FIG. **10** presumes that the user has configured the system to pause the radio-on-demand session when a communication is accepted and made audible to the user **1031**.

When contact management software is available, and if the communication is deemed to require the use of such software **1041**, the user is provided the opportunity to make such notations with respect to the communication **1042** as the user may require. Additionally and/or alternatively, the user may cause or pre-configure the Multimedia Player to log and/or record the communication. The screen display is intended to accommodate both a communications window and a contact management window.

When a pause in the radio-on-demand session, whether resulting from the acceptance of a communications or a user's pause command, exceeds a certain time limit **1051**, the Multimedia Player may automatically disconnect the linkage to the video server or put, for example, the disc module to sleep **1052**. In such instances the Multimedia Player and/or the provider retain the required information to initiate the transmission of the radio-on-demand session at the appropriate point. Upon completion of the communication **1053/1055** or when the play command is issued by the user, if disconnection occurred or the disc module was put to sleep **1052**, the Multimedia Player will reestablish the linkage with the provider and/or awaken the disc module **1054**.

Contemporaneously with the acceptance of the communication **1011**, routines are enabled to identify a point at which to resume the radio-on-demand session **1061**, resume the radio-on-demand session responsive to the identified suitable resumption point **1062**, update the radio-on-demand session's information items **1063**, reschedule and/or delete item(s) in the radio-on-demand session **1064**, and continue the radio-on-demand session responsive to the updating and the rescheduling **1065**.

A radio-on-demand session may be resumed, responsive to a user's preferences and the duration of the communication, at the point placed on hold, at some predefined amount of time prior to the point placed on hold, at a beginning of an audio unit, at a beginning of a next audio unit, and/or at a suitable prior or following point that is identified by the radio-on-demand session schedule. Since, the schedule of the radio-on-demand session identifies the beginning point of the audio unit in which the pause occurred, and the beginning point of a following audio unit, it is advantageous to utilize the radio-on-demand session schedule to automatically identify a suitable point **1061** to resume the radio-on-demand session **1062**.

In instances where at least a portion of the audio unit prior to the paused point is replayed, the user re-engages the radio-on-demand session without a loss of continuity. This is particularly advantageous when, for example, playing an interview.

Since the duration of the communication is significant to, for example, the currency of the information which may have been retrieved and scheduled for playing, the updating **1063** and rescheduling **1064** routines need not be enabled prior to resumption of the radio-on-demand session **1065**. The resumption of the radio-on-demand session **1062** with, for example, a musical item provides the time that may be required to update information items no longer current **1063** and reschedule the items in the session **1064**. This time may be extended with, for example, a playing of another song.

In a portable Multimedia Player implementation comprising only one external communications means, e.g., a single phone line, utilized by the reception of the communication, the updating of the items **1063** would occur after the communication is completed **1053** and the portable Player is able to "call" the provider to obtain updated information.

Thus, in the method detailed with respect to FIG. **10**, a communication is synergistically incorporated within and becomes a part of a radio-on-demand session, and with a single user command, whether play or the termination of the communication, the radio-on-demand session is resumed from a suitable point relative to the point at which it was paused, updated and rescheduled.

While the disclosure has principally focused on the integration of the playing of musical items with a playing of informational items, the scope of the present inventions do not require a playing of musical items. For example, a user may desire to download to a portable Multimedia Player only informational items including, news of interests, emails, and other communications to be played while, for example, driving or exercising. FIG. **11** is a flow chart detailing the steps of the downloading of audio and/or information responsive to a user's information preferences from a remote source and in due course to a portable device for subsequent playing.

A comparison of the method of FIG. **11** with the method of FIG. **7** reveals that music preferences and the playing of musical items present in the method of FIG. **7** are not active in the method of FIG. **11**. In the method of FIG. **11**, if information preferences have been preestablished **741** and they are not to be modified, then initialization proceeds with the routines required to obtain information **751**. If the information preferences have not been preestablished **741**, or they are to be modified, then initialization proceeds with enabling the routines required to establish information preferences **742**.

In those instances where the transmission of the information can be responsive to the information preferences, i.e., on-demand **751**, then the information preferences and/or the required information are communicated to the information provider **752**, and the information that is selected in response to the information preferences and/or the required information is received **753**. Otherwise, for example, broadcasted

information is received **754**, to which the information preferences may be applied to select only the appropriate information **755**. A radio-on-demand session need do nothing more extract informational items being broadcasted.

In the method of FIG. **11**, a radio-on-demand session is further advantageously and significantly distinguished by the subsequent step, if required **1101**, of downloading the informational items from the Multimedia Player that obtained them to a second Multimedia Player **1102** (e.g., a portable player) for subsequent playing of the information items **1103** until, for example, the user terminates the playing **1104**. In this case, the user is likely to control and manage the operation of both devises.

In those instances where the informational items are directly received by the Multimedia Player, portable or not, that the user will utilize to play the informational items **1101**, then the step of downloading **1102** is skipped.

It is emphasized that the various methods and steps detailed with respect to FIGS. **7–11** are not mutually exclusive. For example, a user may start to play interleaved and sequenced musical and informational items as detailed with respect to FIG. **7** steps **701–762** by means of a PC. At some point the user may terminate the playing **763**, and download only the balance of the informational items that have not been played to a portable digital audio player for subsequent playing as detailed with respect to FIG. **11** steps **1102–1103**.

Further, it is also noted that steps in a method and between methods may be repeated. For example, the process of downloading content between players could be repeated between two players in either direction any number of times. This would be particularly advantageous where a downloaded informational item is an advertisement for which the user receives a credit for an apparent listening, as previously detailed with respect to FIG. **8**. In this case, the second Multimedia Player would transfer back to the first Multimedia Player the required listening verification data.

The teachings disclosed herein, directly and indirectly by, for example, incorporation, are intended to show a variety of architectures, services, capabilities, systems, methods, and inventive elements which are combined, and may be combined, to suit particular embodiments. The synergies among and between the various inventive elements is a significant feature of the disclosures herein. Where a teaching may be deemed to be at cross purposes, or otherwise incompatible, with some other teaching, it ought to be understood as a possible alternative to be utilized as a particular embodiment may require.

While elements of the inventions have been detailed in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations are possible and will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alternatives, modifications, variations, and combinations as fall within the spirit and scope of the specification.

The intent of incorporation is to derive the full benefits of the integration of the teachings herein with the teachings of the references cited. The incorporation by reference at a specific place within the specification is not intended to limit the extent to which the reference is incorporated, or the manner in which it may be integrated. The teachings that has been cited and incorporated herein are offered by way of example, and not limitation, of the underlying foundation of knowledge and skill that is available to a practitioner.

Since the art is well established, many of the features, components, and methods found therein may be incorporated, as suggested herein, in a preferred embodiment; and since other modifications and changes varied to fit particular requirements and environments will be apparent to those skilled in the art, the inventions are not limited to the embodiments explicitly set forth or suggested herein. It is to be understood that the inventions are not limited thereby. Examples that have been provided are not intended to limit the scope of the specification. It is also to be understood that the specific details shown are merely illustrative, and that the inventions may be carried out in other ways without departing from the spirit and scope of the specification.

What is claimed is:

1. An apparatus capable of playing audio, the apparatus comprising:

communicating means for communicating a user's information preferences to a remote information provider, and for receiving informational items that are responsive to said user's information preferences;

processing means for alternating and sequencing, for said user, a playing of the received informational items with a playing of a plurality of musical items included in an audio library of said user; and

playing means for playing, for said user and responsive to said alternating and sequencing, said received informational items within a playing of said plurality of musical items.

2. The apparatus of claim **1**, wherein a playing of at least one informational item comprises a voice synthesizing of data obtained from an internet-based information provider.

3. The apparatus of claim **1**, wherein a playing of an at least one informational item is responsive to a schedule preferences of said user; and wherein a playing of musical items is responsive to a tracking of a multiple playing of a musical item.

4. The apparatus of claim **1**, wherein a verified apparent listening of a playing of an at least one informational item is associated with a credit given to said user.

5. The apparatus of claim **1**, wherein a communication for said user and unrelated to the received informational items is received and integrated within a playing of musical items.

6. An apparatus capable of playing audio, the apparatus comprising:

communication means for receiving a plurality of informational items from a remote information provider;

processing means for selecting informational items from said plurality of informational items responsive to a user's information preferences, and for alternating and sequencing, for said user, a playing of the selected informational items with a playing of a plurality of musical items included in an audio library of said user; and

playing means for playing, for said user and responsive to said alternating and sequencing, said selected informational items within a playing of said plurality of musical items.

7. The apparatus of claim **6**, wherein a playing of at least one informational item comprises a voice synthesizing of data obtained from an internet-based information provider.

8. The apparatus of claim **6**, wherein a playing of an at least one informational item is responsive to a schedule preferences of said user; and wherein a playing of at least one informational item is activated by a play control corresponding to a preestablished information preference.

9. The apparatus of claim **6**, wherein a verified apparent listening of a playing of an at least one informational item is associated with a credit given to said user.

10. The apparatus of claim 6, wherein a communication for said user and unrelated to the received informational items is received and integrated within a playing of musical items.

11. A method of playing audio, the method comprising the steps of:

communicating a user's information preferences to a remote information provider;

receiving, from said information provider, informational items that are responsive to said user's information preferences;

alternating and sequencing, for said user, a playing of the received informational items with a playing of a plurality of musical items included in an audio library of said user; and

playing, for said user and responsive to said alternating and sequencing, said received informational items within a playing of said plurality of musical items.

12. The method of claim 11, wherein a playing of at least one informational item comprises a voice synthesizing of data obtained from an internet-based information provider.

13. The method of claim 11, wherein a playing of an at least one informational item is responsive to a schedule preferences of said user; and wherein a playing of musical items is responsive to a tracking of a multiple playing of a musical item.

14. The method of claim 11, wherein a verified apparent listening of a playing of an at least one informational item is associated with a credit given to said user.

15. The method of claim 11, wherein a communication for said user and unrelated to the received informational items is received and integrated within a playing of musical items.

16. A method of playing audio, the method comprising the steps of:

communicating, by means of a first apparatus, a user's information preferences to a remote information provider;

receiving, from said information provider and by means of said first apparatus, informational items that are responsive to said information preferences;

alternating and sequencing, for said user, at least some of the received informational items with a plurality of musical items included in an audio library of said user;

downloading from said first apparatus to a second apparatus the alternated and sequenced informational and musical items; and

playing, by means of said second apparatus, the downloaded alternated and sequenced informational and musical items.

17. The method of claim 16, wherein a playing of at least one informational item comprises a voice synthesizing of data obtained from an internet-based information provider.

18. The method of claim 16, wherein at least one of said downloaded informational items is at least a portion of a previously broadcasted program.

19. The method of claim 16, wherein a verified apparent listening of a playing of an at least one informational item is associated with a debit.

20. The method of claim 16, wherein a communication for said user and unrelated to the received informational items is received and integrated within said playing.

* * * * *

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United States Patent [19]

Gershen

[11] Patent Number: 5,801,694

[45] Date of Patent: Sep. 1, 1998

[54] **METHOD AND APPARATUS FOR INTERACTIVELY CREATING NEW ARRANGEMENTS FOR MUSICAL COMPOSITIONS**

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[21] Appl. No.: **567,370**

[22] Filed: **Dec. 4, 1995**

[51] **Int. Cl.**[6] **G06F 3/00**; G09B 15/02; G10G 3/00

[52] **U.S. Cl.** **345/339**; 84/602; 707/530

[58] **Field of Search** 395/339, 328, 395/792; 386/52; 84/602, 603, 609, 462; 360/13; 345/326-358; 707/530

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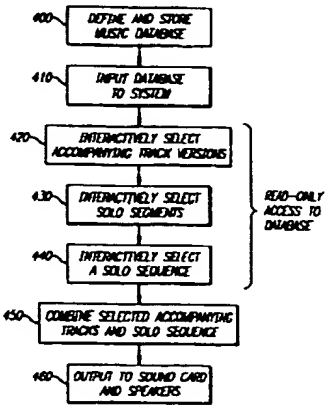
Primary Examiner—A. Katbab

Attorney, Agent, or Firm—Irell & Manella LLP

[57] **ABSTRACT**

Methods and apparatus are provided for interactively creating new arrangements of prerecorded musical works. The musical work is represented on a digital medium in the form of a database comprising a plurality of fixed musical sequences, and a template comprising a plurality of sequence positions. Each sequence position may represent one track of a musical arrangement, such as the performance of one instrumental group, or a musical solo. The various tracks are intended to be played simultaneously, in parallel. In addition, some of the sequence positions may represent fixed-length, partial segments of a single track that are intended to be played serially. Using a menu-driven, graphical interface, a user interactively selects a plurality of the fixed musical sequences, as desired, and allocates the selected sequences among the various fixed sequence positions specified by the template. The musical sequences are then combined in accordance with the user's selections, thus creating a new arrangement of the musical work. In this way, users of varying levels of sophistication can be given a musically structured framework for interactively constructing new arrangements of recorded musical works.

24 Claims, 8 Drawing Sheets



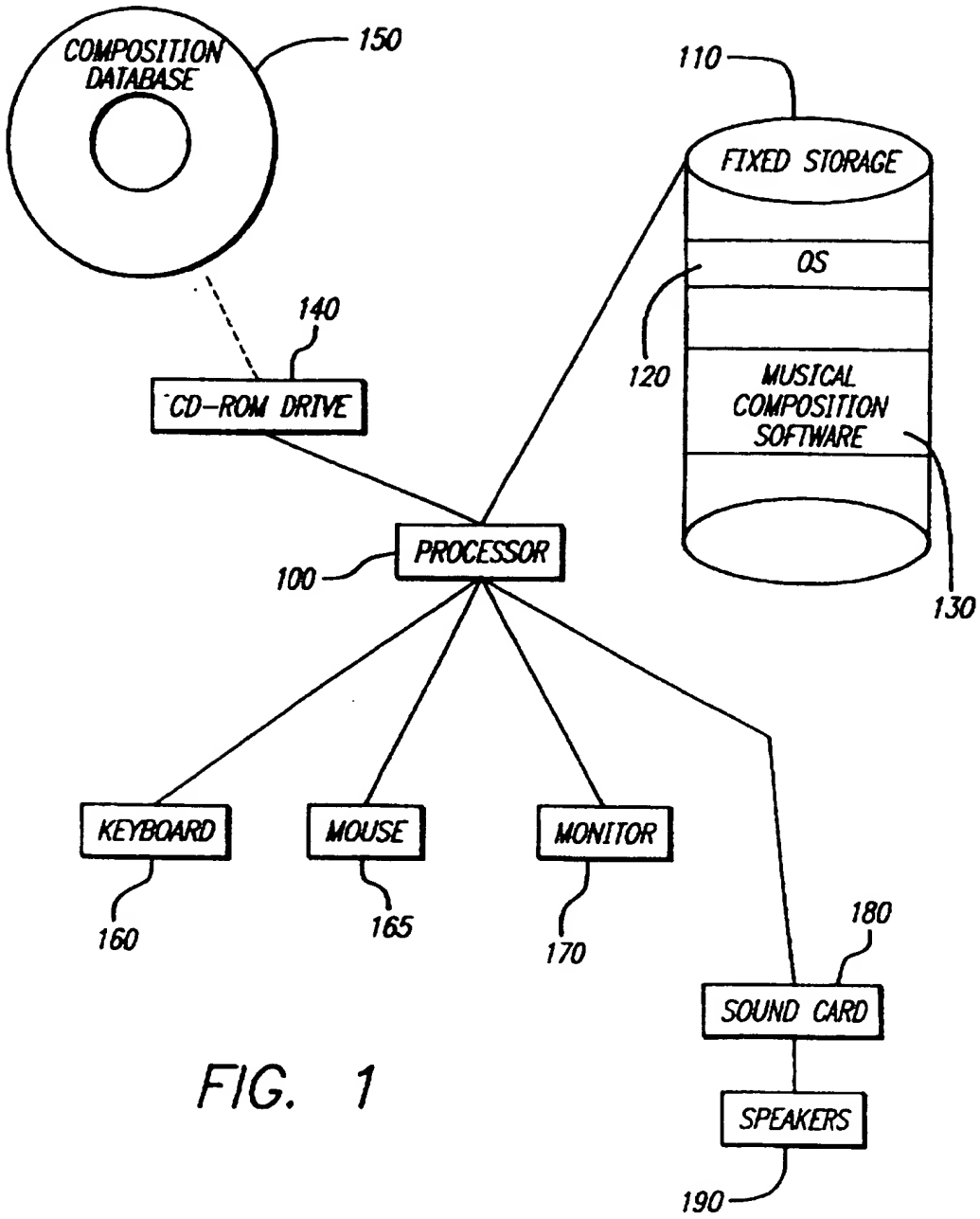

COMPOSITION DATABASE
150
110
FIXED STORAGE
OS
120
MUSICAL COMPOSITION SOFTWARE
130
140
CD-ROM DRIVE
PROCESSOR
100
KEYBOARD
MOUSE
MONITOR
160
165
170
180
SOUND CARD
SPEAKERS
190

FIG. 1

FIG. 2

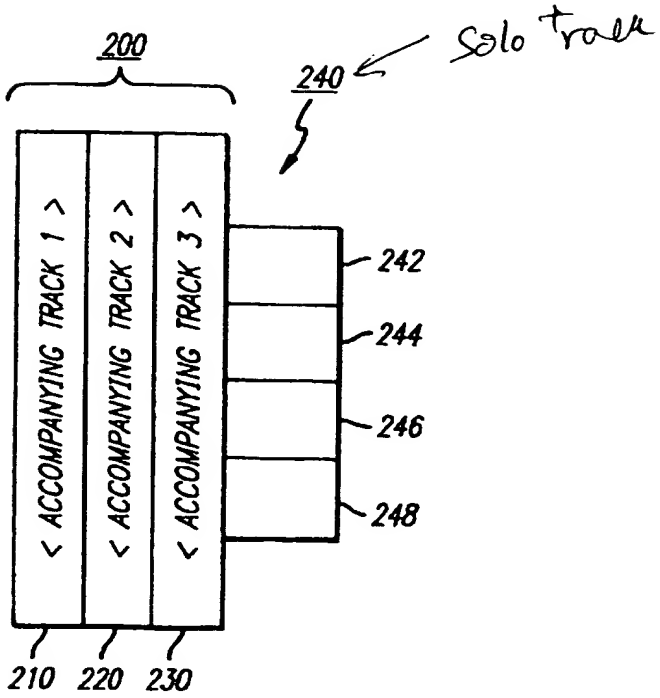

200
240
Solo track
< ACCOMPANYING TRACK 1 >
< ACCOMPANYING TRACK 2 >
< ACCOMPANYING TRACK 3 >
242
244
246
248
210
220
230

FIG. 4

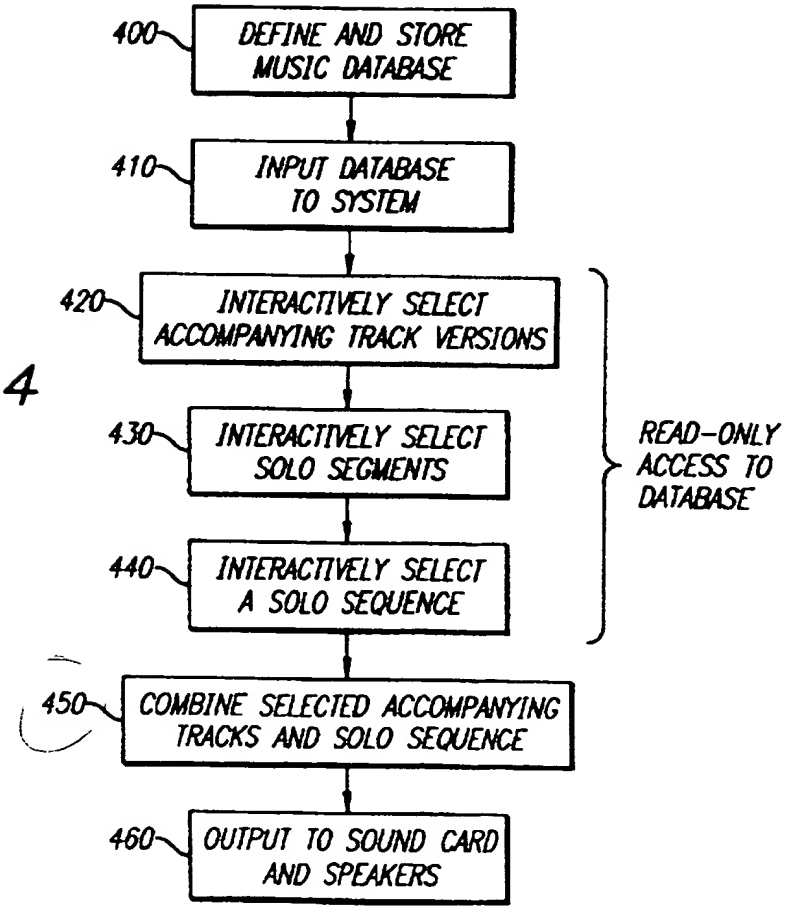

400
DEFINE AND STORE MUSIC DATABASE
410
INPUT DATABASE TO SYSTEM
420
INTERACTIVELY SELECT ACCOMPANYING TRACK VERSIONS
430
INTERACTIVELY SELECT SOLO SEGMENTS
440
INTERACTIVELY SELECT A SOLO SEQUENCE
READ-ONLY ACCESS TO DATABASE
450
COMBINE SELECTED ACCOMPANYING TRACKS AND SOLO SEQUENCE
460
OUTPUT TO SOUND CARD AND SPEAKERS

FIG. 3

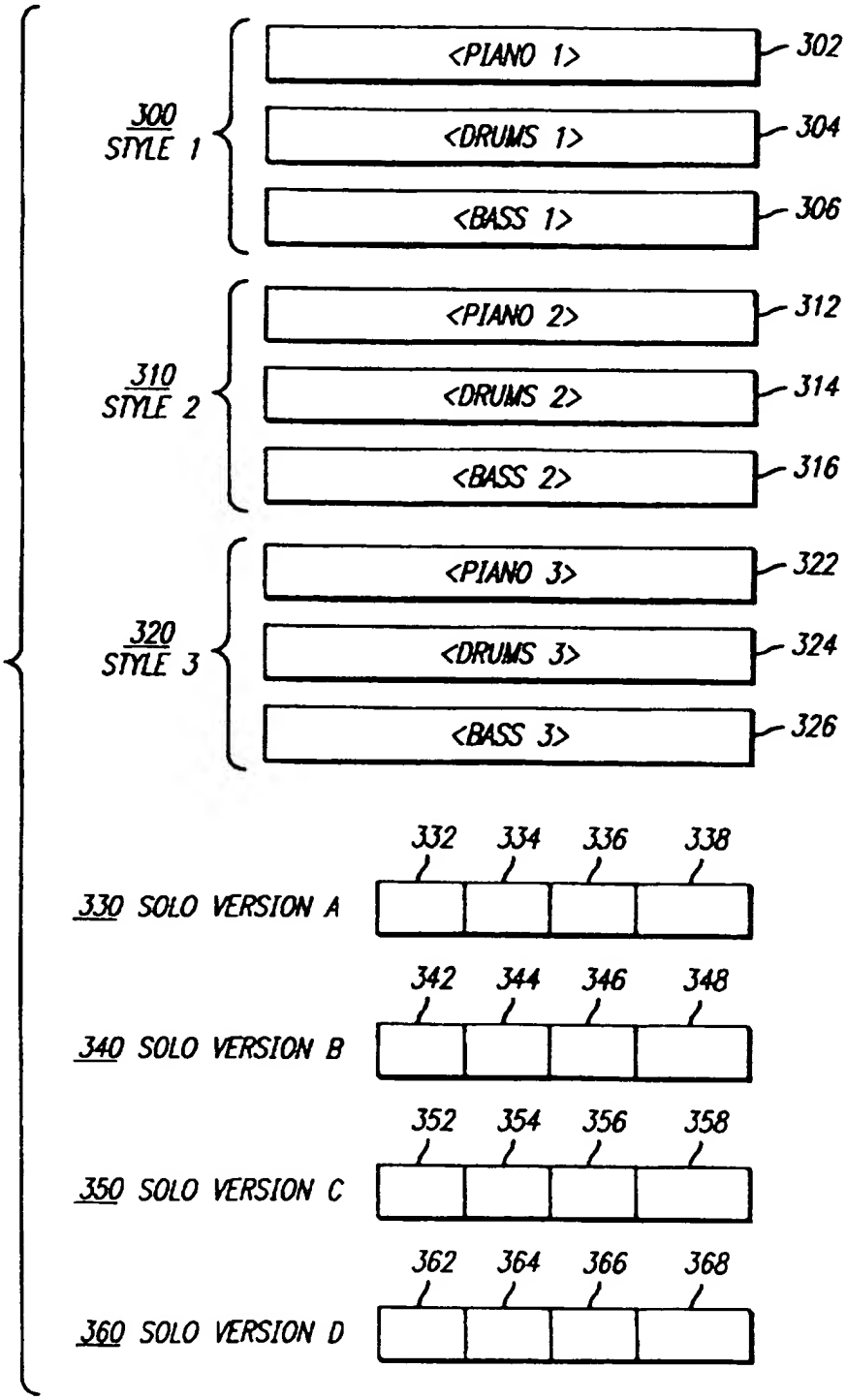

300
STYLE 1
<PIANO 1>
302
<DRUMS 1>
304
<BASS 1>
306
310
STYLE 2
<PIANO 2>
312
<DRUMS 2>
314
<BASS 2>
316
320
STYLE 3
<PIANO 3>
322
<DRUMS 3>
324
<BASS 3>
326
330 SOLO VERSION A
332
334
336
338
340 SOLO VERSION B
342
344
346
348
350 SOLO VERSION C
352
354
356
358
360 SOLO VERSION D
362
364
366
368

FIG. 5

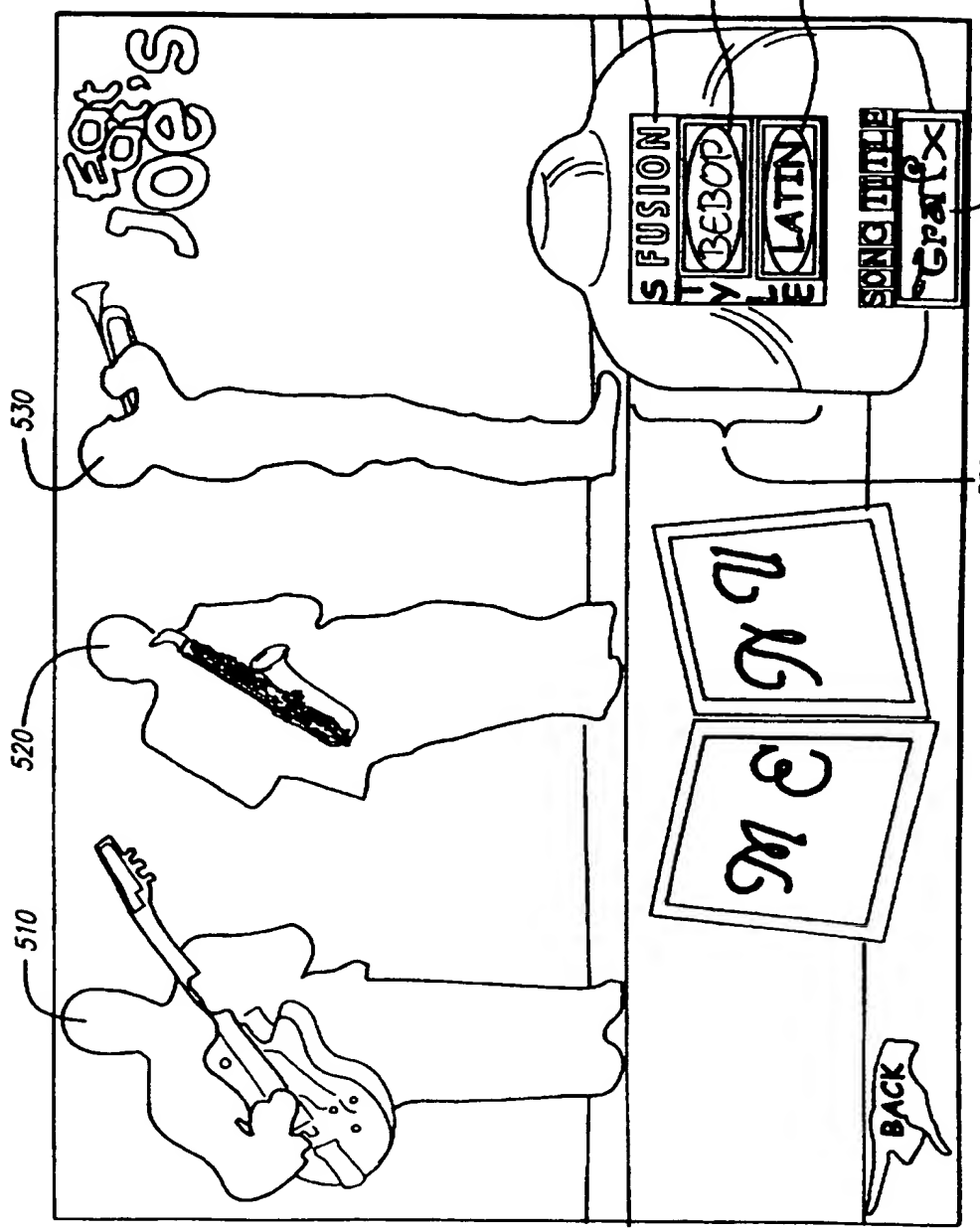

Joe's
FUSION
BEBOP
LATIN
SONG TITLE
Gray
BACK
510
520
530
540
550
560
570
580

FIG. 6a

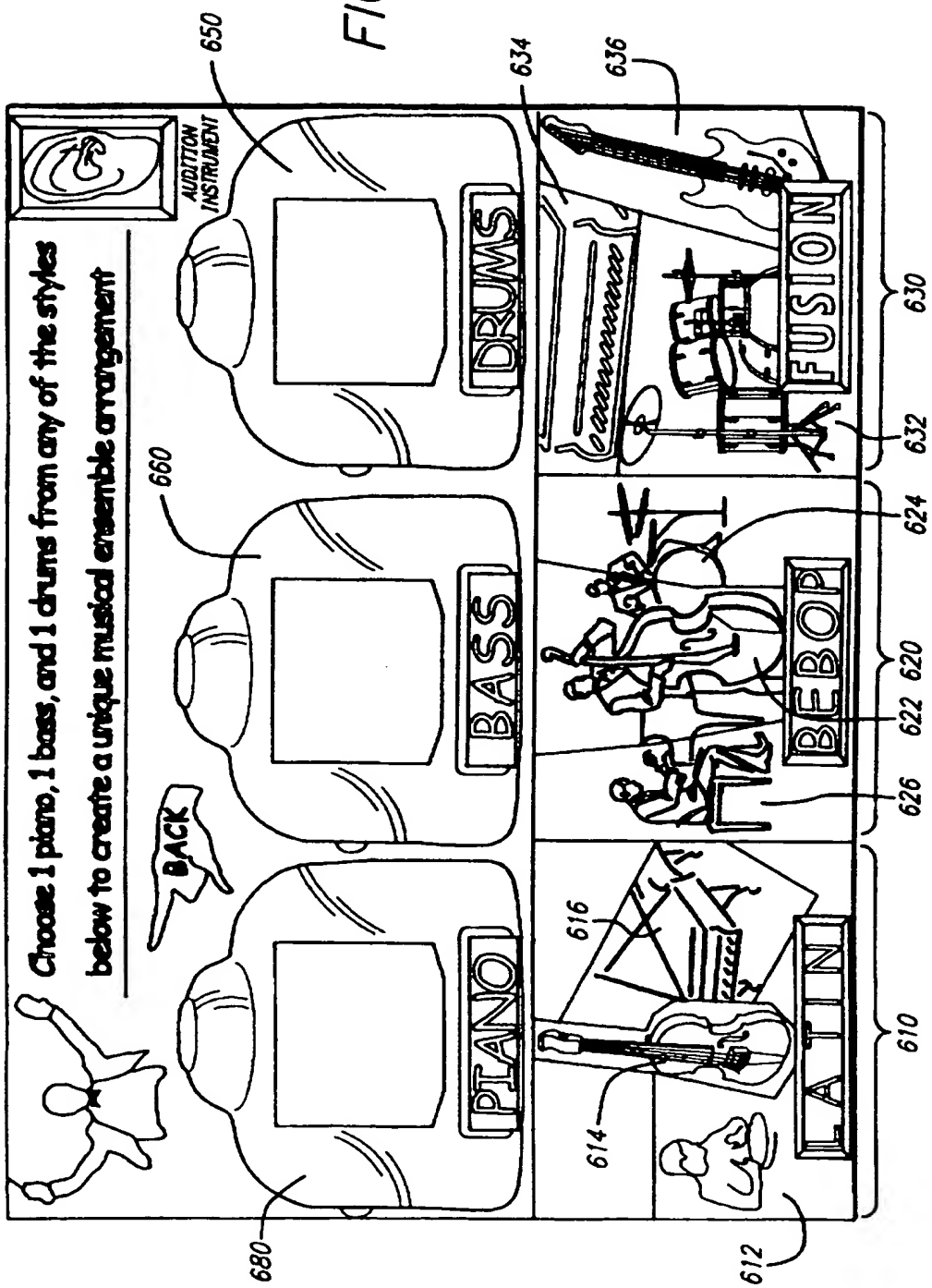

Choose 1 piano, 1 bass, and 1 drums from any of the styles below to create a unique musical ensemble arrangement
AUDITION INSTRUMENT
BACK
PIANO
BASS
DRUMS
LATIN
BEBOP
FUSION
610
612
614
616
620
622
624
626
630
632
634
636
650
660
680

FIG. 7a

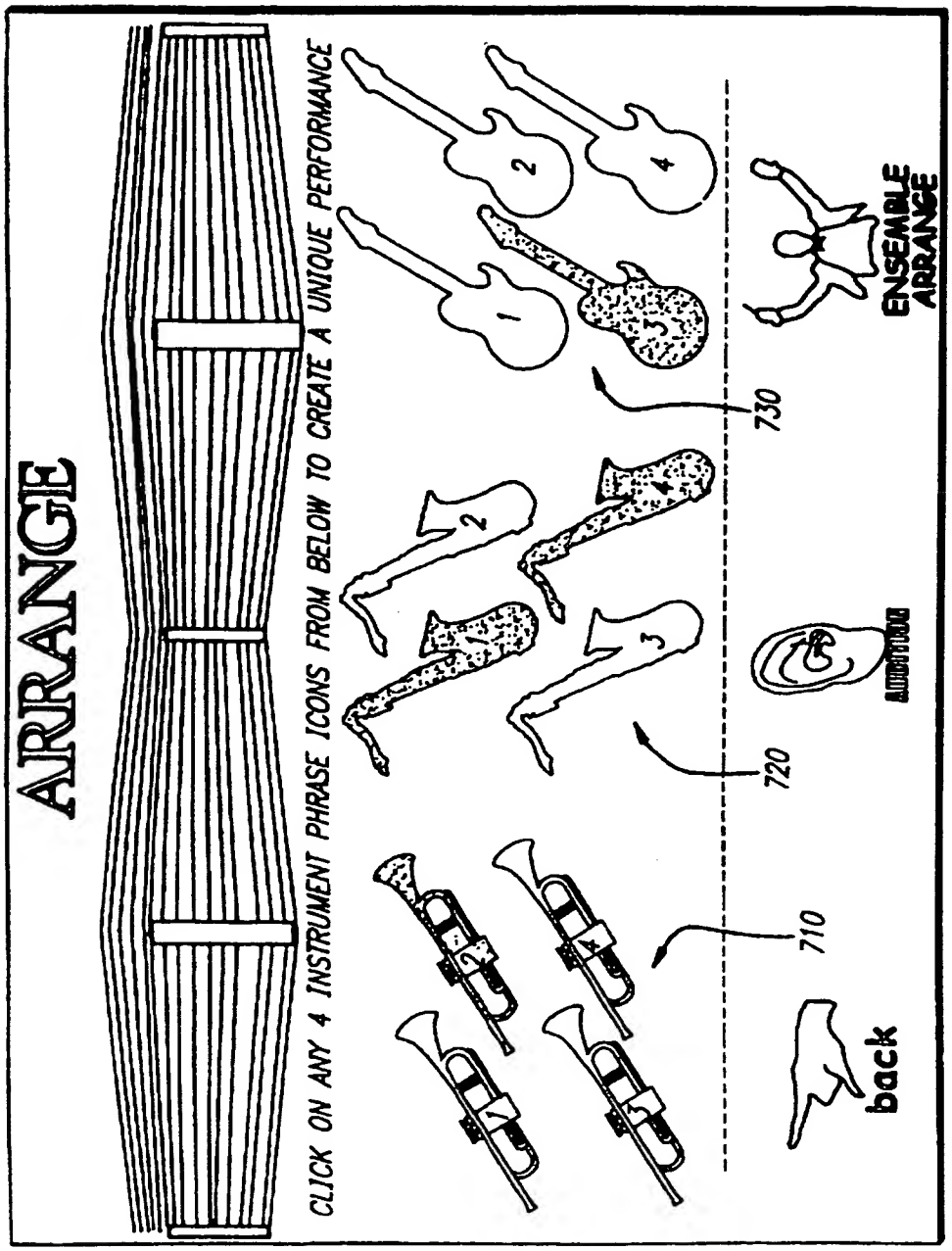

ARRANGE
CLICK ON ANY 4 INSTRUMENT PHRASE ICONS FROM BELOW TO CREATE A UNIQUE PERFORMANCE
730
720
710
back
ENSEMBLE ARRANGE

FIG. 7b

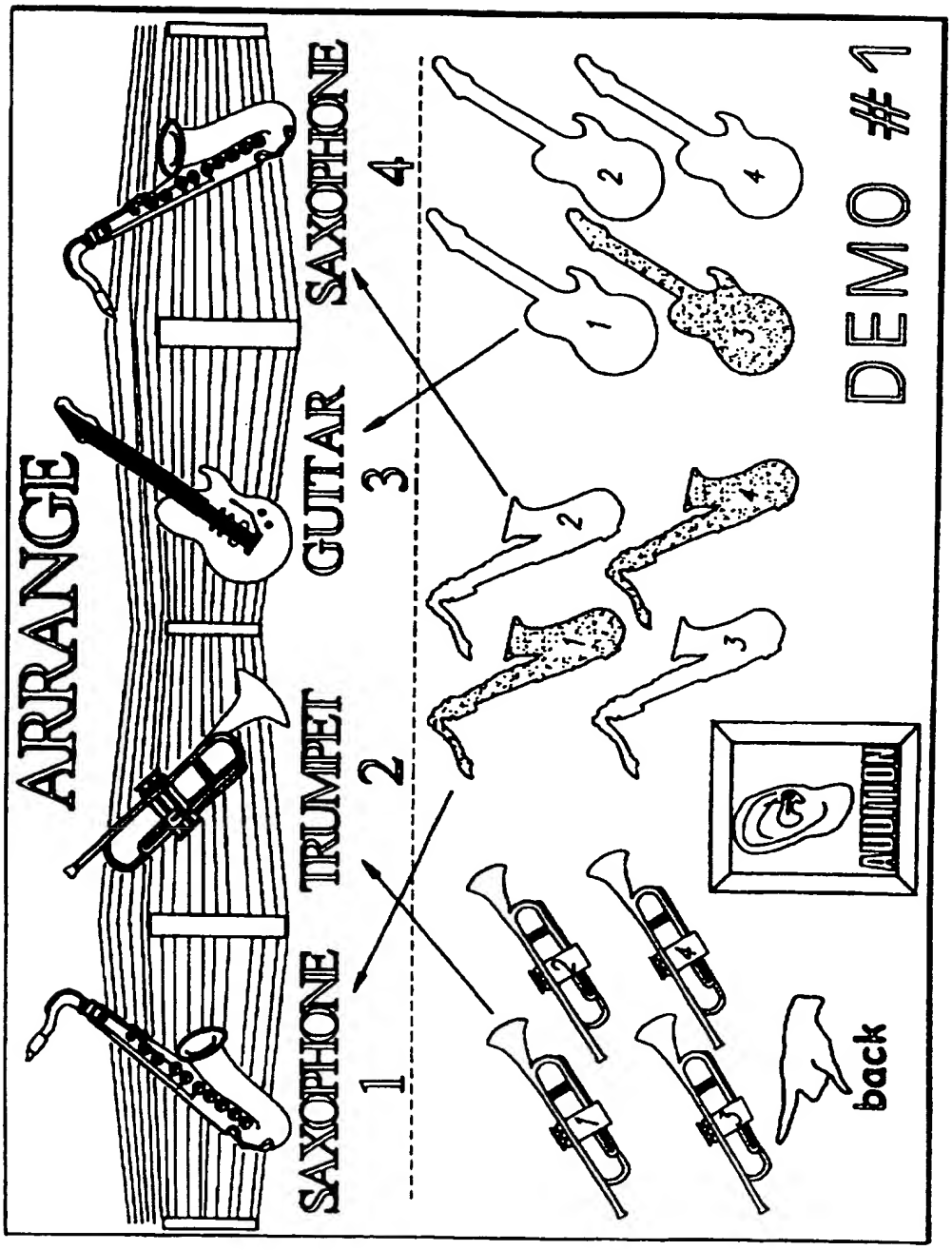
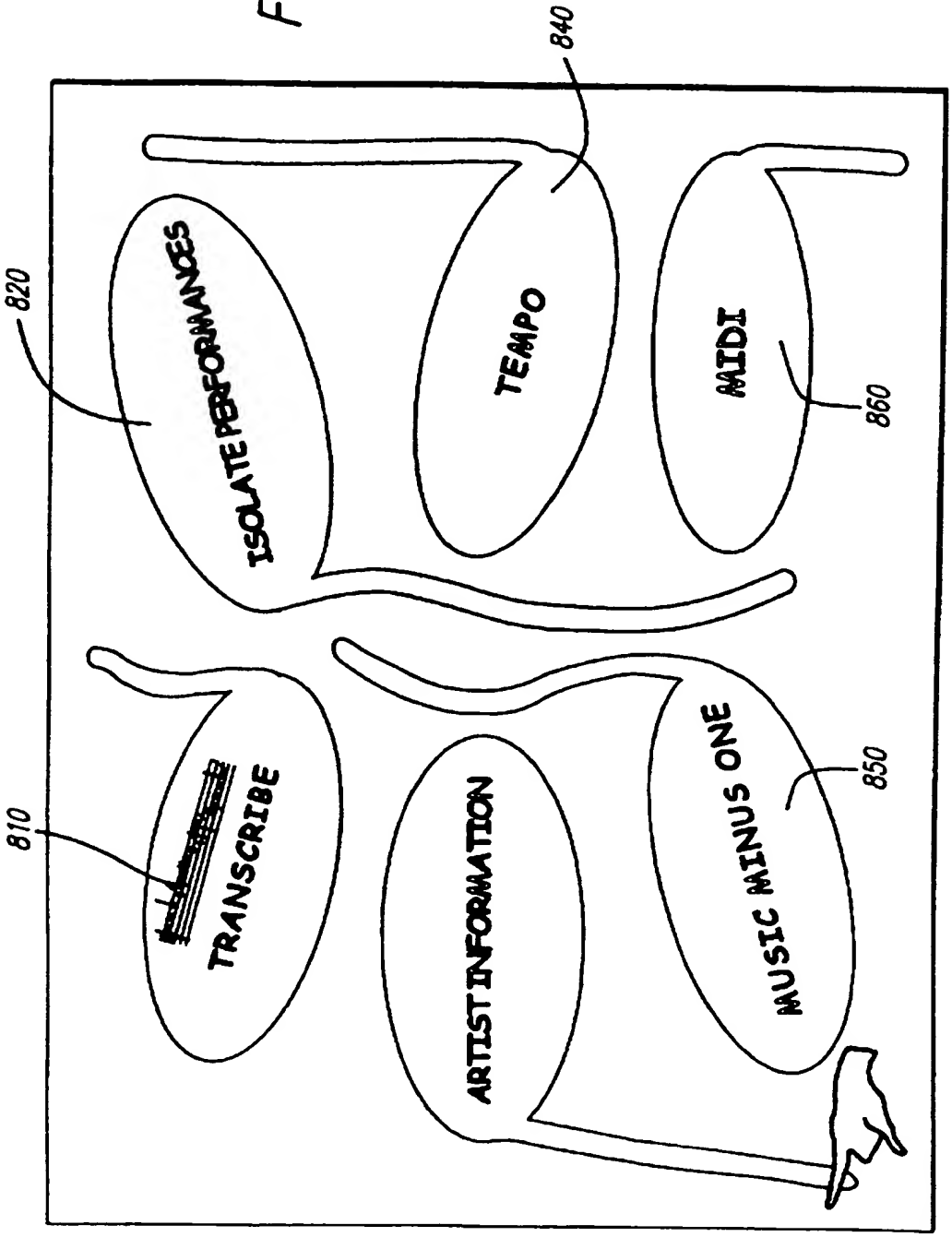

ARRANGE
SAXOPHONE
TRUMPET
GUITAR
SAXOPHONE
1
2
3
4
DEMO #1
AUDITION
back

FIG. 8


810
TRANSCRIBE
820
ISOLATE PERFORMANCES
840
TEMPO
860
MIDI
ARTIST INFORMATION
850
MUSIC MINUS ONE

METHOD AND APPARATUS FOR INTERACTIVELY CREATING NEW ARRANGEMENTS FOR MUSICAL COMPOSITIONS

FIELD OF THE INVENTION

This invention relates to the field of interactive computer technology, and more particularly to an application of computer technology to the problem of interactively arranging prerecorded musical compositions.

BACKGROUND OF THE INVENTION

Musical works, whether in analog or digital form, have traditionally been sold to consumers in relatively non-interactive forms. For example, a compact disk or audio cassette containing a prerecorded musical performance enables a user to hear and enjoy a faithful reproduction of the original musical performance. However, the user is not expected or encouraged to alter materially the underlying music.

That is not to say that no end-user interaction with music has ever previously been possible. Indeed, compact disk players and even audio cassette players have traditionally allowed users to adjust the volume or even the frequency equalization of recorded music; to rewind, fast-forward, and skip through recorded music; and to rearrange the play order of multiple musical works. However, in the prior art, end-users have generally not been provided with convenient facilities enabling them to dissect a musical work into its component parts, and to rearrange those parts into a new musical work in a musically meaningful manner.

More recently, a number of supposedly "interactive" musical titles have been created for the burgeoning multimedia market, but these titles typically do little more than add graphical liner notes, annotations, and commentary to the underlying musical performance. In other words, by entering interactive input, such as through a mouse or other cursor-control device, users of these prior art titles are able to display corresponding musical lyrics, sheet music, or even video background material about the recording artist, all while listening to the underlying prerecorded composition. Some titles further permit users to adjust the volume or equalization of a given work's constituent components. However, in the prior art, users have not been provided with suitable facilities enabling users to dissect and dynamically reassemble the components of prerecorded musical compositions and thereby interactively create their own, new arrangements of such compositions.

At the other end of the spectrum, various high-end tools do exist which allow the professional recording engineer to digitally process, manipulate, and modify prerecorded music. However, such equipment generally does not impose meaningful, structural constraints on the degree of musical processing and modification that can be performed. In other words, such equipment offers too much freedom and complexity, and not enough structure and guidance, for less sophisticated end-users. In short, what is desired is a structured methodology and architecture that will give end-users with varying levels of musical sophistication the rewarding experience of dissecting and exploring prerecorded musical works, and of interactively constructing new, customized arrangements of those works.

SUMMARY OF THE INVENTION

The present invention provides methods and apparatus for interactively creating new arrangements for prerecorded musical works. In accordance with the present invention, a musical work is stored and represented on a digital medium (such a CD-ROM compact disc) in the form of a digital database comprising a plurality of fixed musical sequences that collectively make up the musical work, and a template specifying a plurality of fixed sequence positions for arrangements of the musical work. Each sequence position in the template may represent a single track within a multi-track musical arrangement, which may correspond to the performance of one instrumental group or of a musical solo, for example. The various tracks of a multi-track arrangement are intended to be played simultaneously, i.e., in parallel. In addition, some of the sequence positions may represent component segments of a single track, intended to be played serially.

This digital medium is provided as input to a digital processor system as described herein. A user then interactively selects a plurality of the fixed musical sequences as desired, and interactively allocates the selected sequences among the various fixed sequence positions defined by the template. Interactive selection is preferably performed using a menu-driven, graphical user interface. The selected musical sequences are then combined in accordance with the user's allocation scheme, thus creating a new arrangement of the musical work.

Preferably, in a further aspect of the present invention, the various musical sequences correspond to performances of the musical work in distinctive musical styles and by different instrument groups. A preferred structure and size is also disclosed for those musical sequences that represent component segments.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a preferred high-level system architecture in accordance with the present invention.

FIG. 2 illustrates a representative architecture for a musical work in accordance with the present invention.

FIG. 3 illustrates a representative architecture for a musical database in accordance with the present invention.

FIG. 4 illustrates a flow diagram for a basic methodology in accordance with the present invention.

FIG. 5 illustrates a graphical user interface for selecting a style of an accompanying ensemble.

FIG. 6*a* illustrates a graphical user interface for selecting a version of a track for each one of various instrument groups within the accompanying ensemble.

FIG. 7*a* illustrates a graphical user interface for selecting an arrangement of solo segments.

FIG. 7*b* shows a display resulting from selecting a solo arrangement.

FIG. 8 illustrates a graphical user interface for invoking additional features of a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 depicts the general architecture of a digital processor-based system for practicing the present invention. Processor **100** is preferably a standard digital computer microprocessor, such as a CPU of the Intel x86 series, Motorola PowerPC series, or Motorola 68000 series. Processor **100** runs system software **120** (such as Apple Macintosh OS, Microsoft Windows, or another graphically-oriented operating system for personal computers), which is

stored on storage unit 110, e.g., a standard internal fixed disk drive. Musical composition software 130, also stored on storage unit 110, includes computer program code for the processing steps described below, including providing graphical user interfaces ("GUI's"), and accessing and assembling digital music tracks and segments in response to interactive user selections. Processor 100 is further coupled to standard CD-ROM drive 140, for receiving compact disc 150 which contains the musical database and template information described in more detail below. Users utilize standard personal computer keyboard 160 and cursor control device 165 (e.g., a mouse or trackball) to enter the GUI input commands discussed below, which are then transmitted to processor 100. Display output, including the GUI output discussed below, is transmitted from processor 100 to video monitor 170 for display to users. Musical works as arranged by processor 100, under the control of composition software 130 and based upon the data of digital medium 150, are transmitted to sound card 180, preferably a standard personal computer sound card, and are thereafter output to audio loudspeakers 190 for listening.

In the preferred embodiment of the present invention, a musical composition as illustrated in FIG. 2, is comprised of an ensemble accompaniment 200 and a simultaneous solo track 240 of shorter duration (in the preferred embodiment eight musical measures long). This structure is intended to correspond to the actual structure of music composition in many classical and popular genres which structures include solo segments and accompaniments incorporated into single musical works.

The ensemble accompaniment 200 is further comprised, in the preferred embodiment, of two or more single instrument tracks. In FIG. 2, these are represented by 210 (accompanying track 1), 220 (accompanying track 2), and 230 (accompanying track 3). According to the present invention, the user may interactively select from a plurality of individual instrumental sections to be composed as a single ensemble accompaniment by combining user selections as accompanying tracks 1, 2, and 3 in the template spaces marked 210, 220, and 230 in FIG. 2, and as further described below.

The solo track 240 is further comprised of four two-musical-measure segments 242, 244, 246, and 248 arranged serially. It is readily apparent that the segments 242, 244, 246, and 248 may be of any uniform length, which length roughly corresponds to natural musical phrases. In accordance with the present invention, the user may interactively select from a plurality of two-measure solo instrumental or vocal sections to re-assemble items 242, 244, 246, and 248 in a different serial order to comprise a new solo track 240, which the digital computer plays back simultaneously with the ensemble accompaniment 200.

The solo track 240; the ensemble accompaniment 200; the accompaniment tracks 210, 220 and 230; and the solo segments 242, 244, 246 and 248 must be of specific durations in order to preserve musical rhythms. Methods of creating digitally encoded sounds of specified durations such that those sounds may reliably be re-assembled in a rhythmically correct manner are well known to those of ordinary skill in the art. SMPTE time code is an example of one such commonly used method.

The user interactively selects from a musical database illustrated in FIG. 3 when choosing various musical elements to comprise the musical composition structure illustrated in FIG. 2. In the preferred embodiment, the musical database is comprised of a plurality of pre-selected ensemble accompaniment sections 300, 310, and 320. Each ensemble accompaniment is pre-composed by an expert musician and adheres to a particular musical style, such that ensemble accompaniment 300 adheres to style 1, ensemble accompaniment 310 adheres to style 2, and ensemble accompaniment 320 adheres to style 3. Each ensemble accompaniment is in turn comprised of three or more instrumental parts; for example, piano (segments 302, 312, and 322), drums (segments 304, 314, and 324), and bass (segments 306, 316, and 326). In the preferred embodiment, the user may interactively select one piano segment 302, 312, or 322; one drum segment 304, 314, or 324; and one bass segment 306, 316, or 326, such that each ensemble accompaniment (FIG. 2, Section 200) shall be assembled by the user making these selections for all or some of these three instruments.

The musical database is further comprised in the preferred embodiment of three different solo track versions, from which the user may select two measure blocks to assemble in serial for the solo track represented as block 240 in FIG. 2. Within the musical database, in the preferred embodiment, each of four solo track versions 330, 340, 350, and 360 is comprised of a musical solo as played by a single performer on a single instrument. Each solo track version, in turn, is comprised of four two-musical-measure segments assembled serially so that solo track version A 330 is comprised of two-musical-measure blocks 332, 334, 336, and 338; solo track version B 340 is composed of two-musical-measure blocks 342, 344, 346, and 348; solo track version C 350 is comprised of two-musical-measure blocks 352, 354, 356, and 358; solo track version D 360 is comprised of two-musical-measure blocks 362, 364, 366, and 368. The present invention enables the user interactively to select from any of the twelve two-musical-measure segments comprising all four of the Solo versions when assembling the user's own solo track as represented in block 240 of FIG. 2.

Assembly of elements from the musical database represented in FIG. 3 into the musical composition architecture represented in FIG. 2 follows the steps illustrated in FIG. 4.

The music database described above is defined, stored and inputted into a memory device, which, in the preferred embodiment, is the compact disk 150. As previously described, the present invention enables the end-user of the compact disk 150 to interactively select elements from the pre-selected music database stored on the Compact Disk 150 and interactively assemble such selections into the musical composition architecture illustrated in FIG. 2. FIG. 4 is a flow diagram showing the basic steps of this process. At step 400, a music expert defines sections of a pre-recorded musical performance and divides them into the ensemble accompaniment Tracks and solo tracks as discussed above. At step 410, that definitional information is inputted into the database and recorded on the Compact Disc 150 for end-user use (such as a CD-ROM, or internet server). Steps 420, 430, and 440 illustrate the end-user's "Read Only" access to the pre-defined music database. At step 420, the present invention permits end-users to interactively select accompanying tracks to comprise the ensemble accompaniment 200 section of the musical composition. At step 430, the present invention allows the end-user interactively to select the solo segments 242, 244, 246, 248. At step 440, the present invention permits the end-user interactively to select a serial sequence for the solo segments selected in step 430.

At step 450, the present invention, using time code, that has been inputted into the database at step 410, combines the accompaniment tracks 210, 220 and 230 into the ensemble accompaniment 200 and combines the solo segments 242,

244, 246, and 248 into the sequence selected by the end-user to comprise the solo track 240. The timecode designation may be according to SMPTE or other well known methods. At 460, the present invention outputs the user-defined musical arrangement to the computer sound-card and speakers.

The great variety of different musical variations obtainable under the present invention is worthy of note. 559,872 different musical compositions may be assembled based only on the 21 musical components contained in the preferred embodiment. Three styles are available for each of three instruments used to comprise the ensemble accompaniment, for 27 (3*3*3=27) possible compositions of the ensemble accompaniment 200. 12 individual solo segments are available for each of the solo segments 242, 244, 246, and 248, for 20,736 possible compositions of the solo track 240. In total there are 27 ensemble accompaniments which may be combined with any of 20,736 solo tracks for 559,872 different musical compositions which end users may create using the preferred embodiment of the present invention.

FIG. 5 is a sample user interface from which the end-user may interactively select styles for ensemble accompaniments in accordance with the present invention. Block 540 displays the title of the overall musical composition. Block 550 displays the user's choices of ensemble accompaniment styles. In this illustration, the user may select from fusion style icon 560, be-bop style icon 570, or latin style icon 580. When the user clicks on the fusion style icon 560 in this illustration, he hears the fusion style ensemble accompaniment playing through the sound card 180 and the loudspeakers 190. When the user clicks on the be-bop style icon 570 in this illustration, he hears the be-bop style ensemble accompaniment playing through the sound card 180 and the loudspeakers 190. When the user clicks on the latin style icon 580 in this illustration, he hears the latin style ensemble accompaniment playing through the sound card 180 and the loudspeakers 190. Furthermore, in this illustration, the blocks 510, 520, and 530 illustrate the identity of the solo artists performing the solo segments.

In the preferred embodiment, the user may interactively select three instrumental tracks that comprise the ensemble accompaniment: piano, drums and bass. FIG. 6-A illustrates a graphical user interface permitting the user to select the desired musical style for each of the three instrument accompanying tracks within the ensemble accompaniment. For each instrument (bass, drums and piano), the user may select from one of three styles: a latin icon 610 latin, a be-bop icon 620, or a fusion icon 630. By clicking on the corresponding image, the user may interactively select a drums version (612, 624, and 632), a bass version (614, 622, and 636), and a piano version (616, 626, and 634). In the current illustration, the user's drums selection appears in a juke box icon 640; the user's bass selection appears in a juke box icon 660; and the user's piano selection appears in juke box 680.

FIG. 7A illustrates a screen that allows users to select the four two-musical measure segments that comprise the eight measure solo track in the preferred embodiment. In the present illustration, icons representing the four segments of a trumpet solo track 710 are arranged in the order intended by the original performer or musical expert (first 712, then 714, then 716, and last 718). Similarly, icons representing saxophone and guitar solo tracks (720 and 730, respectively) are arranged in the order intended by the original performer or musical expert (saxophone: first 722, then 724, then 726 and last 728; guitar: first 732, then 734, then 736, and last 738.) The user may listen to or audition any particular solos segment by first clicking on the desired segment icon (712, 714, 716, 718, 722, 724, 726, 728, 732, 734, 736 or 738) and then clicking on an audition button 780. For instance, if the user first selected segment icon 722, and then clicked on the audition button 780, he would hear the first individual segment of the saxophone solo track. In order to assemble four solo segments into the solo track 240, the user clicks on each desired solo segment icon and then drags the selection into one of four desired sequence positions represented by icons 740, 750, 760, and 770. The solo segment icon placed in the position 740 will play first. The solo segment icon placed in position 750 will play second. The solo segment icon placed in position 760 will play third, and the solo segment icon placed in position 770 will play last. In the present illustration when the user selects a button 790, the computer system in FIG. 1 plays the entire user defined musical composition, including solo track and ensemble accompaniment.

Once the user interactively selects solo segments by clicking on individual solo segments and dragging them into the sequence position icons 740, 750, 760 and 770 in sequence, the display shown in FIG. 7-B results. The preferred embodiment of the present invention permits users to access other information about the music and manipulate the music in other ways.

FIG. 8 illustrates a graphic user interface for invoking these additional features of a preferred embodiment of the present invention. By interactively selecting an icon 810 the user may view a transcription of his own musical composition created in accordance with the present invention. By clicking on an icon 820 the user may listen to individual instrumental voices within the musical composition he created in accordance with the present invention, or the original musical composition intended by the original performer. By clicking on an icon 830, the user can view additional data pertaining to the musical performers, including video text and interviews. By clicking on an icon 840 the user may speed up or slow down the tempo of his own musical composition created in accordance with the present invention, or the musical composition as intended by the original performer. Because the present invention is implemented through the use of digitally encoded audio, the tempo of music may be slowed down or increased without affecting the music's timbre or pitch. By clicking on an icon 850 the user may select individual voices or instruments to be deleted from the musical composition created by user in accordance with the present invention or the original musical composition as intended by the original performer. By clicking on an icon 860 the user may access the MIDI-code of the user's own musical composition assembled in accordance with the present invention, or the musical composition as intended by the original performer. Accessing the MIDI-code corresponding to the digitally encoded audio allows the user to manipulate the musical composition using a variety of third-party computer software music tools.

Other Variations

Detailed illustrations and preferred embodiments of the present invention have been provided herein for the edification of those of ordinary skill in the art, and not as a limitation on the scope of the invention. Numerous variations and modifications within the spirit of the present invention will of course occur to those of ordinary skill in the art in view of the preferred embodiments that have now been disclosed. Such variations, as well as any other systems embodying or practicing any of the following claims, all remain within the scope of the present invention:

I claim:

1. A method for creating a new arrangement of a musical work, said method for use with a digital processor and comprising the following steps:

storing a musical database defining a plurality of fixed musical sequences representing the musical work, and a musical template defining a plurality of fixed sequence positions with reference to time, said template representing the musical work;

providing the musical database and the musical template as an input to the digital processor;

interactively selecting a plurality of the fixed musical sequences, as desired by an end-user;

interactively allocating the selected musical sequences among the fixed sequence positions of the template, as desired by the end-user; and

combining the selected musical sequences in accordance with the desired allocation, thereby creating the new arrangement of the musical work.

2. The method of claim 1, wherein a plurality of the fixed sequence positions of the template represent parallel tracks, and wherein the step of combining the selected musical sequences includes integrating the selected musical sequences allocated to the parallel tracks in a parallel manner.

3. The method of claim 2, wherein the selected musical sequence allocated to each of the parallel tracks represents a performance of the musical work in a distinctive style.

4. The method of claim 2, wherein the selected musical sequence allocated to each of the parallel tracks represents a distinctive instrument group.

5. The method of claim 1, wherein a plurality of the sequence positions of the template are component segments of a single track; and wherein the step of combining the selected musical sequences includes integrating the selected musical sequences allocated to the component segments in a serial manner.

6. The method of claim 5, wherein the step of interactively allocating the selected musical sequences among the sequence positions includes assigning one of the selected musical sequences to each of the component segments and specifying a desired playing order for the musical sequences assigned to the component segments.

7. The method of claim 5, wherein each of the component segments is a fixed number of musical measures in length.

8. The method of claim 7, wherein the fixed number of musical measures is two.

9. The method of claim 7, wherein the fixed number of musical measures is any fixed number of measures the length of which roughly corresponds to the length of natural musical phrases.

10. The method of claim 1, wherein the musical sequences each comprise digitally sampled music.

11. The method of claim 1, wherein the musical database is stored on a read-only digital medium.

12. The method of claim 1, wherein the steps of interactive selection are performed using a menu-driven graphical user interface.

13. The apparatus of claim 5, wherein the means for interactively allocating the selected musical sequences among the sequence positions include means for assigning one of the selected musical sequences to each of the component segments, and means for specifying a desired playing order for the musical sequences assigned to the component segments.

14. The apparatus of claim 5, wherein each of the component segments is a fixed number of musical measures in length.

15. The apparatus of claim 7, wherein the fixed number of musical measures is two.

16. The apparatus of claim 7, wherein the fixed number of musical measures is any fixed number of measures the length of which roughly corresponds to the length of natural musical phrases.

17. An apparatus for creating a new arrangement of a musical work, comprising:

one or more digital media storing a musical database, said database defining a plurality of fixed musical sequences with reference to time, said template representing the musical work, and further storing a musical template defining a plurality of fixed sequence positions representing the musical work; and

a digital processor system further comprising:

input means for reading the contents of the digital media;

means for interactively selecting a plurality of the fixed musical sequences, and for interactively allocating the selected musical sequences among the fixed sequence positions of the template, as desired by the end-user; and

means for combining the selected musical sequences in accordance with the desired allocation, thereby creating the new arrangement of the musical work.

18. The apparatus of claim 17, wherein a plurality of the fixed sequence positions of the template represent parallel tracks, and wherein the means for combining the selected musical sequences include means for integrating the selected musical sequences allocated to the parallel tracks in a parallel manner.

19. The apparatus of claim 18, wherein each one of a plurality of the selected musical sequences represents a performance of the musical work in a distinctive style.

20. The apparatus of claim 18, wherein each one of a plurality of the selected musical sequences represents a distinctive instrument group.

21. The apparatus of claim 17, wherein a plurality of the sequence positions of the template are component segments of a single track; and wherein the means for combining the selected musical sequences include means for integrating the selected musical sequences allocated to the component segments in a serial manner.

22. The apparatus of claim 17, wherein the musical sequences each comprise digitally sampled music.

23. The apparatus of claim 17, wherein the digital media comprise one or more read-only digital media.

24. The apparatus of claim 17, wherein means for performing interactive selections comprise means for generating a menu-driven graphical user interface.

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